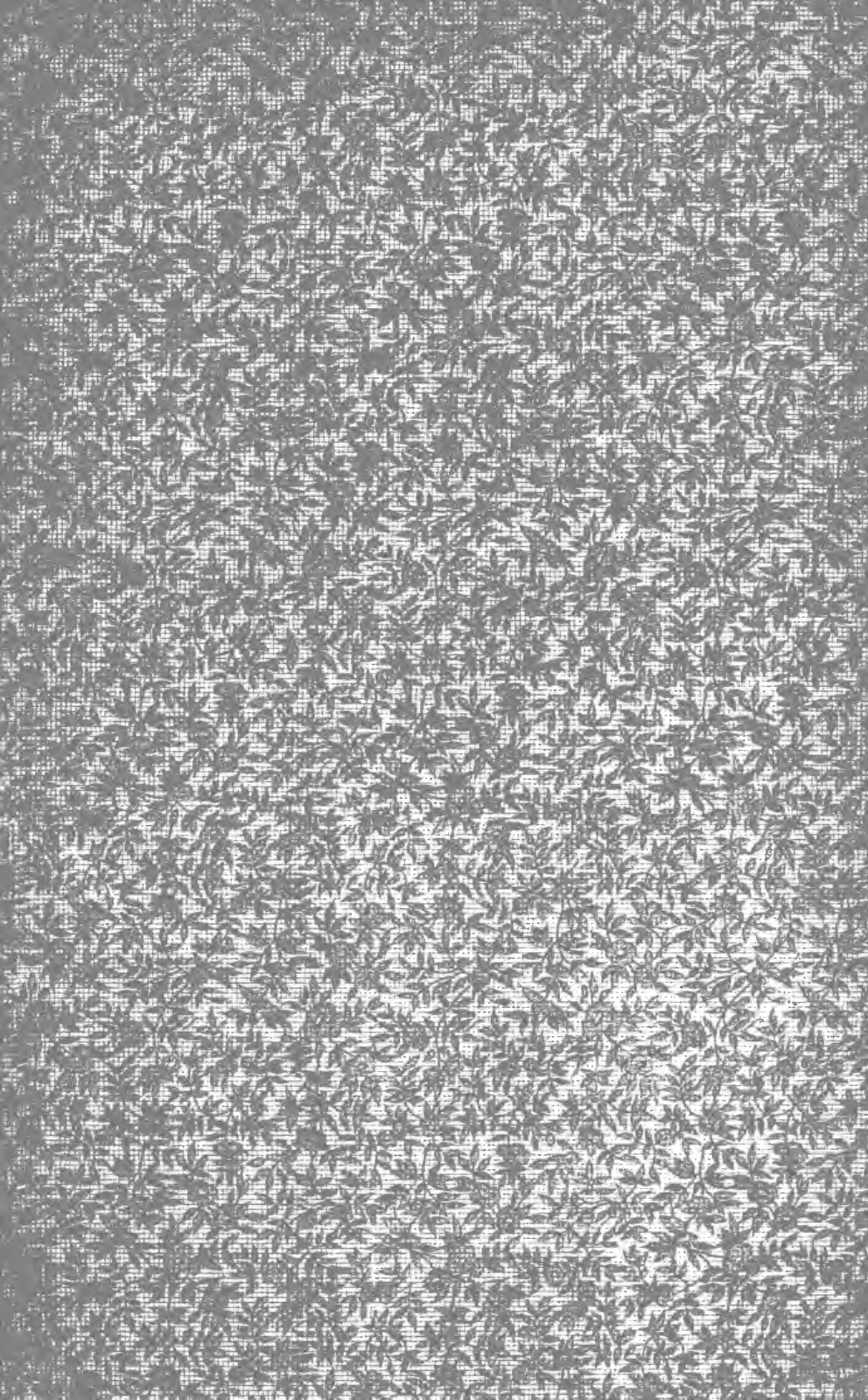
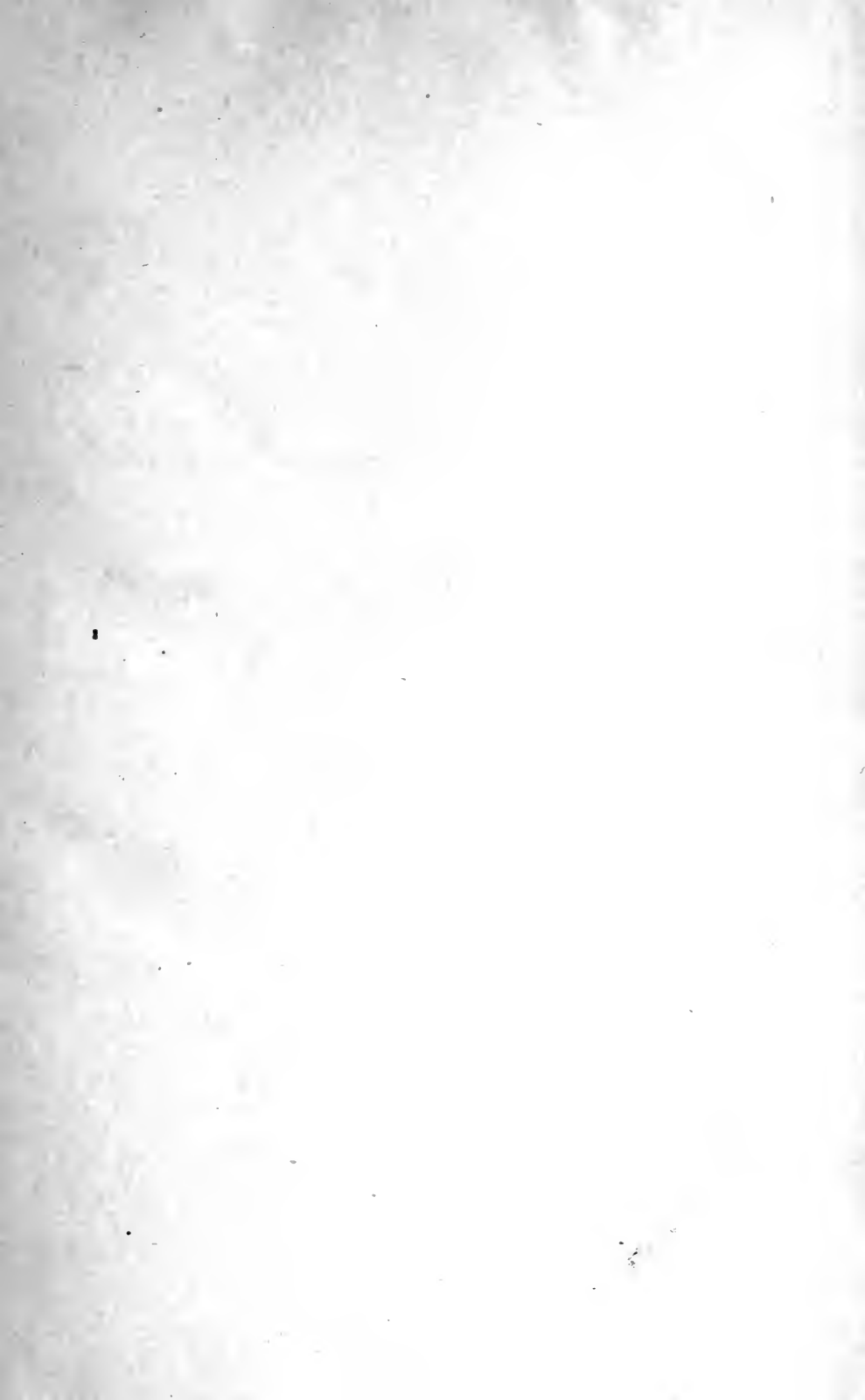


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OF THE

UNIVERSAL MEDICAL SCIENCES

AND

ANALYTICAL INDEX.

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL SANITARY
SCIENCES THROUGHOUT THE WORLD.

EDITED BY

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AND

SEVENTY ASSOCIATE EDITORS,

ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
AND CORRESPONDENTS.

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TABLE OF CONTENTS OF VOLUME FOURTH

AND

ASSOCIATE EDITORS.

DISEASES OF THE SKIN, Section A

L. BROCC, M.D.,

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DISEASES OF THE NASAL AND ACCESSORY CAVITIES, PHARYNX, LARYNX, AND ESOPHAGUS, Section D

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DISEASES OF THE GLANDULAR SYSTEM OF THE NECK, Section E

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WALTER WYMAN, A.M., M.D.,

WASHINGTON, D. C.,

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ANATOMY, Section H

L TESTUT, M.D.,

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HISTOLOGY AND MICROSCOPICAL TECHNOLOGY, Section I

CHARLES E. SAJOUS, M.D.,

PARIS.

PHYSIOLOGY, Section J

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VOLUME INDEX, Section K

REFERENCE LIST OF JOURNALS.

CONTENTS OF THE ENTIRE SERIES.

VOLUME I.

DISEASES OF THE LUNGS AND PLEURA. <i>Wilson</i>	Section A
DISEASES OF THE HEART AND BLOOD-VESSELS. <i>Whittier and Vickery</i>	Section B
DISEASES OF THE MOUTH, STOMACH, LIVER, AND PANCREAS. <i>Robin</i>	Section C
CHOLERA; DISEASES OF THE INTESTINES AND PERITONEUM; INTESTINAL AND OTHER PARASITES. <i>Griffith</i>	Section D
DISEASES OF THE KIDNEYS, BLADDER, AND ADRENALS; URINALYSIS. <i>Rubino</i>	Section E
DIABETES MELLITUS. <i>Lépine</i>	Section F
FEVERS, INFLUENZA, VARIOLA, ETC. <i>Daland</i>	Section G
INFECTIOUS DISEASES OF CHILDREN. <i>Smith and Hazen</i>	Section H
INTUBATION. <i>O'Dwyer</i>	Section I
RHEUMATISM AND GOUT. <i>Davis</i>	Section J
DISEASES OF THE BLOOD AND SPLEEN. <i>Henry</i>	Section K
VOLUME INDEX	Section L

REFERENCE LIST OF JOURNALS.

VOLUME II.

DISEASES OF THE BRAIN. <i>Gray and Pritchard</i>	Section A
DISEASES OF THE SPINAL CORD. <i>Obersteiner</i>	Section B
PERIPHERAL NERVOUS DISEASES, MUSCULAR DYSTROPHIES, AND GENERAL NEUROSES. <i>Semelaigne</i>	Section C
MENTAL DISEASES. <i>Rohé</i>	Section D
INEBRIETY, MORPHINISM, AND KINDRED DISEASES. <i>Kerr</i>	Section E
DISEASES OF THE GENITO-URINARY APPARATUS IN THE FEMALE. <i>Montgomery</i>	Section F
DISEASES OF PREGNANCY. <i>Lutaud</i>	Section G
OBSTETRICS, PUERPERAL DISEASES, AND DISEASES OF THE MAMMARY GLAND. <i>Grandin</i>	Section H
DIETETICS OF INFANCY; DISEASES OF THE NEWBORN. <i>Currier</i>	Section I
BACTERIOLOGY. <i>Sajous</i>	Section J
VOLUME INDEX	Section K

REFERENCE LIST OF JOURNALS.

VOLUME III.

SURGERY OF THE BRAIN, SPINE, AND NERVOUS SYSTEM. <i>Pilcher</i>	Section A
THORACIC SURGERY. <i>Gaston</i>	Section B
ABDOMINAL SURGERY. <i>Bull and Coley</i>	Section C
DISEASES OF THE RECTUM AND ANUS. <i>Kelsey</i>	Section D
SURGICAL DISEASES OF THE GENITO-URINARY APPARATUS IN THE MALE. <i>Keyes and Fuller</i>	Section E
SYPHILIS. <i>White</i>	Section F

ORTHOPÆDIC SURGERY. <i>Sayre</i>	Section G
DISEASES OF THE BONES AND JOINTS, AMPUTATIONS, AND RESECTIONS. <i>Conner</i> and <i>Freeman</i>	Section H
FRACTURES AND DISLOCATIONS. <i>Stimson</i>	Section I
DISEASES OF THE ARTERIES AND VEINS. <i>Fenger</i>	Section J
PLASTIC SURGERY; SURGICAL DISEASES OF THE JAWS AND MOUTH. <i>Matas</i>	Section K
TUMORS. <i>Laplace</i>	Section L
SURGICAL DISEASES. <i>Tiffany and Warfield</i>	Section M
VOLUME INDEX	Section N

REFERENCE LIST OF JOURNALS.

VOLUME IV.

DISEASES OF THE SKIN. <i>Brocq</i>	Section A
OPHTHALMOLOGY. <i>Oliver and Posey</i>	Section B
OTOLOGY. <i>Turnbull and Bliss</i>	Section C
DISEASES OF THE NASAL AND ACCESSORY CAVITIES, PHARYNX, LARYNX, AND ESOPHAGUS. <i>Sajous and Turner</i>	Section D
DISEASES OF THE GLANDULAR SYSTEM OF THE NECK. <i>Witherstine</i>	Section E
LEGAL MEDICINE. <i>Draper</i>	Section F
HYGIENE AND EPIDEMIOLOGY. <i>Wyman</i>	Section G
ANATOMY. <i>Testut</i>	Section H
HISTOLOGY AND MICROSCOPICAL TECHNOLOGY. <i>Sajous</i>	Section I
PHYSIOLOGY. <i>Howell and Dreyer</i>	Section J
VOLUME INDEX	Section K

REFERENCE LIST OF JOURNALS.

VOLUME V.

GENERAL AND EXPERIMENTAL THERAPEUTICS, HYDROTHERAPY, BALNEOLOGY, AND CLIMATOLOGY. <i>Hare</i>	Section A
ELECTRO-THERAPEUTICS. <i>Apostoli and Grand</i>	Section B
SURGICAL DRESSINGS. <i>Van Imschoot</i>	Section C
TOXICOLOGY: FORENSIC, ACCIDENTAL, AND INDUSTRIAL. <i>Witherstine</i>	Section D
ANÆSTHETICS. <i>Buxton</i>	Section E

SUPPLEMENT.

ANALYTICAL INDEX AND CYCLOPÆDIA OF TREATMENT.

GENERAL INDEX OF THE FIVE VOLUMES.

REFERENCE LIST OF JOURNALS.

DISEASES OF THE SKIN.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

L. BROCCQ, M.D.,
ASSOCIATE EDITOR,
PARIS.

Acne.—Meibomian acne, a variety of sty or hordeolum, has been studied by Valude, of Paris. ¹⁴_{July 21, '95} Sty has its seat between the lashes or outside of them. Meibomian acne is usually found in the excretory canal of the Meibomian gland, inside the lashes. The ordinary sty disappears without treatment, while Meibomian acne follows a chronic course without tendency to recovery unless the contents of the gland be emptied by surgical intervention. The disease is principally met with in adults and but rarely in children. It is not like hordeolum common to lymphatic persons, but rather to arthritic persons predisposed to ciliary blepharitis. It is not unusual to see these inflammations of the terminal canaliculi of the Meibomian glands repeated on several points of the same eyelid, with varying degrees of intensity. Treatment consists in emptying each inflamed canaliculus and preventing any recurrence by washing with hot boric-acid solution and applying red-precipitate ointment. Attention should also be paid to the arthritic condition.

J. J. Pringle ⁶⁹⁷_{Apr., '95} described a severe case of acne scrofulosorum in a large, flabby girl, aged 16, with no tubercular family history, but with enlarged cervical glands. The eruption appeared eight weeks previously as numerous "boils" on the face, which rapidly spread over the trunk and limbs until the whole body was covered with spots. The lesions, which were intermingled with ordinary acne pustules and comedones, were extremely numerous, developed in crops, suppurated freely and left deep, livid, blue scars, most noticeable over the buttocks and thighs. The arms were also deeply pitted.

Gervais ²⁰⁰⁰_{'95} has studied the professional acne peculiar to workers in paraffin. The eruption is papular, furunculous, or acneiform, and affects the hairy portions of the skin. Paraffin and

heavy oils contain irritating principles, as caustic soda or petroleum, and the intensity of the eruption varies according to the toxic substances handled. Frequent change of clothing, baths, and alkaline lotions are the best prophylactic measures that can be employed.

[As in artificial eruptions, individual predisposition here naturally plays a most important rôle.—L. B.]

Tenneson, of Paris, ¹⁴_{Mar. 20, '96} showed before the Société de Dermatologie et de Syphilographie of Paris a patient suffering from an uncommon variety of acne. In addition to the lesions of common polymorphous acne there were to be found polycyclic patches covered with small, horny elevations situated at the pilæ infundibula; the circles whose segments formed the edge of the patch were of considerable size.

Histologically the horny elevations were formed of corneous cells distending the follicular orifices, and which were not degenerate as in comedones. He asked what term should be applied to this variety of acne.

Hallopeau, of Paris, ¹⁴_{Mar. 20, '96} said that he had seen cases almost similar, but in them the concretions were dark and were found only on the lumbar region, the glands of which react in a special way toward the micro-organism of acne.

In a paper on the same subject, Hallopeau and le Damany, of Paris, ¹⁴_{Apr. 21, '96} stated that two varieties were to be distinguished in Hardy's acne kerata; one characterized by the fact that the comedones are arranged in groups and liable to progressive extension, this predominance on the posterior border of the axillæ and the dorsal aspect of the limbs. The second variety is distinguished by its preference for the sides of the dorso-lumbar region, by the dryness of the comedones, and their indefinite duration without modification.

[The question of these forms of acne needs complete revision. Communications such as those just noted, like all work based on one or two isolated cases, far from elucidating the subject, only tend to obscure it. There are dermatoses which may take the form of what is called acne kerata; in the same way the circinated seborrhœic acne of the thorax, called by Bazin acneic eczema, may sometimes be manifested in the form of miliary papules, horny, and disposed in a circinate manner about the interscapular space, more rarely in the middle of the chest. Acne scrofulosorum may also, in certain cases, assume identical appearances. All these cases should, we repeat, be seriously analyzed and discussed by means of collective research.—L. B.]

The following is a new way of applying sulphur in acne vul-

garis¹⁰⁰_{Sept. 5, '95}: A patient who had been advised to use a preliminary scrubbing with black soap, in order to soften the skin and to enable the sulphur ointment to penetrate more easily, thought it preferable to dissolve the sulphur in benzin to increase its penetrating power and dissolve the fatty elements.

After two days of this new treatment—which consisted in bathing the part affected with benzin in which an excess of sulphur had been dissolved—the eruption grew paler, and on about the sixth day had almost entirely vanished. Since then the patient has carried out the treatment according to circumstances. When his forehead is in good condition, which happens for a month or two at a time, he does nothing. When the eruption re-appears he rids himself of it by a few applications of the lotion. During a journey lasting fifteen days the eruption re-appeared *in toto* and he was not able to apply a treatment until his return, when in three days he was again successful in ridding himself of his acne.

Bardach, of Kreuznach,²¹¹_{June 23, '95} proposes to treat acne vulgaris of the face and trunk by means of the combination of the iodides and bromides of potassium with soap, the latter possessing a quality which the author terms keratolytic, which decidedly increases the action of the iodides and bromides. Bardach prescribes two varieties of soap: strong soaps, containing from 2 to 6 per cent. of sodium iodide and from 1 to 3 per cent. of potassium iodide, and weak soaps, containing but from 1 to 3 per cent. of potassium iodide and bromide.

In carrying out this treatment a more or less vigorous application with the stronger or weaker soap is carried out, attention being paid to the intensity of the eruption and the susceptibility of the integument. In some cases it may be useful to allow the suds to dry upon the face or trunk, even during the whole night. The following days the same process is performed until a manifest improvement is shown; the soap is then used every two or three days only, decreasing the applications gradually in number until complete recovery.

Consecutive irritation of the skin is treated by means of demulcent applications, such as starch- and talc- powders, or Lassar's paste, composed as follows:—

R	Zinc oxide,	25.0 grammes (6½ drachms).
	Starch,	25.0 grammes (6½ drachms).
	Salicylic acid,	0.5 gramme (7½ grains).
	Vaselin,	50.0 grammes (1½ ounces).

Bardach likewise advises to treat the general condition of the patient by means of the iron preparations. Arsenic seemed to

him not to be efficacious. However paradoxical it may appear, this method is stated by the author to have given surprising results, both as to rapidity and duration of recovery.

[We must warn the reader against all these new treatments, which should be used with much prudence and with due thought to the susceptibility of the patient. In the first place there is a tendency to reject preparations of the iodides and bromides in acne, because these substances cause acne in many persons; yet in some rare cases I have personally noted improvement in acne follow the use of minute doses of sodium or potassium iodide and of applications of tincture of iodine. It must never be forgotten, however, that idiosyncrasy may play a most important part in any medication.—L. B.]

Actinomycosis.—J. J. Pringle ²_{Nov. 17, '94}; ⁶⁹⁷_{Dec.} read a paper before the Royal Medical and Chirurgical Society on a case of actinomycosis extensively involving the skin. The patient, a boy aged 13, who lived over a stable-yard, suffered from an apparently simple attack of serous pleurisy, from which he recovered in a month, with marked retraction of the affected right side. Shortly afterward he had abscesses over the front of the chest and right hip, which were considered as tuberculous and scraped. Some months later a very extensive tract of disease implicating the skin, chiefly on the back, showed. The characters of the skin disease were mainly the presence of large sarcomatous-looking growths, ulcerating at various points, situated upon hard, brawny, and deeply undermined skin. From the ulcerative points pus exuded, mixed with characteristic yellow granules, readily recognized microscopically as composed of actinomyses. There was strong presumptive evidence of invasion of the right lung, pleura, liver, kidney, retro-peritoneal and prevertebral tissues. Treatment by iodide of potassium and thyroid tabloids appeared to be attended with benefit. The case was regarded as an example of actinomycotic invasion through the respiratory tract.

At a subsequent meeting ⁶⁹⁷_{Apr., '95} the author reported that the lad had undergone a most remarkable degree of improvement under treatment with iodide of potassium in as large doses as he could tolerate,—viz., 15 grains (1 gramme) three times a day. From time to time it had to be discontinued, as it caused diarrhœa, vomiting, or bronchitis. The sarcomatous-looking masses on the back had withered down to the level of the skin, and had, for the most part, become passive, while in the purulent discharge from the few still active no ray-fungus could be discovered.

Monestié ²⁰⁰⁰_{'95} reports four new cases of cutaneous actinomycosis which were completely cured by the long-continued administration

of potassium iodide in doses of 2 grammes (30 grains) daily. The fourth case was likewise improving when Monestié published his article. The treatment influences not only the local lesion, but rapidly modifies the general condition. It seems to act as a specific.

A. Staub¹¹⁶_{Oct., '94} tried chrysarobin-resorcin and chrysarobin-resorcin-ichthyol plasters, occasionally combined with salicylic acid, in two cases of actinomycosis, which did not allow of operative treatment, but which recovered, showing that the infiltrations could be favorably influenced by antibacillary substances. Pus containing corpuscles was discharged from openings which were either spontaneously or artificially made. The thickening disappeared, while the skin became soft and healthy. In the case of foci in the depth of the skin scarification or the use of antiseptic means is necessary, even in fresh, newly-formed infiltration.

Adenoma Sebaceum.—This disease is a very rare one, as Coleman⁶_{Sept. 14, '95} in describing a case observes. There have, however, been a few cases published in recent years by Balzer, Pringle, and Caspary. In Caspary's case the small tumors had developed after small-pox. Microscopical examination showed them to consist of a great number of sebaceous glands, closely packed in the deeper parts of the corium, the other structures of the skin being healthy. (See ANNUAL, 1892, vol. iv, A-2.)

Adenoma sebaceum is characterized, according to Barlow, of London,³²⁶_{B. 55, p. 61} by the existence of distinct encapsulation with presence of a more or less decided connective-tissue stroma. The degenerated epithelium seems to generally proliferate under the form of distinct lobules, cords, and tubes; it likewise appears that hyaline degeneration, either of the vessels only or of the connective tissue, or of the proliferated epithelium, almost always occurs. The result is that these tumors are also known as cylindromata,—a term which should disappear from literature on account of the variety of tumors which give rise to it. Barlow cites a case where the adenomatous nature of the tumor was demonstrated by the relations between the diseased glands and the pilar follicles, and by the discovery of an excretory canal. With reference to the mode of development and to the prognosis of such tumors, Barlow thinks that they may be produced without previous atheromatous degeneration of the gland. It is very probable that these tumors may become calcified or osseous, and it seems that they may, from time to time, undergo carcinomatous degeneration.

Hallopeau and Leredde, of Paris,¹⁴_{May 15, '95} give an account of a case of adenomata sebacea of the face and trunk, which differs from those which have been published so far by the co-existence with

characteristic manifestation on the face of almost analogous new growths in the lumbar region and the right side of the thorax. In all probability they are productions of a like nature. However, histological examination revealed proliferated sebaceous glands in the tumors of the face only; in the fragment from the lumbar tumors examined these did not exist, sclerous tissue alone being observed. In all probability the glandular proliferation in this region had been invaded secondarily by a connective-tissue new growth.

Commenting on the case, Darier ¹⁴_{May 15, '95} says that it seems at first sight that there are several varieties of adenoma sebaceum. When the tumors are light-colored, the sebaceous glands are found to be dilated and giving out reticulated prolongations. When the tumors are red, vascular dilatations separated by fibrous tissue are found. It is probable that, notwithstanding these histological differences, the same affection is in view, the extreme forms of which are united by intermediary steps.

Moty ¹⁴_{May 15, '95} states that he observed similar lesions to those seen by Hallopeau on the patient's back in a case of lymphatic varices of the left groin. These lesions were congenital and stigmata of hysteria were likewise present. Nervous disturbances probably play a part in the pathogenesis of these alterations.

Alopecia Areata.—Henry Waldo, of Clifton, Eng., ⁶_{Aug 24, '95} read a paper before the British Medical Association in which he stated that cases of alopecia areata often get well without the application of a parasiticide or other local applications,—a fact which strengthens the neurotic theory. Moderate stimulation of the more or less anæsthetic surfaces, however, is often advantageous,—as, for example, compound tincture of camphor well rubbed in and around the patches. Thyroid extract has given him negative results.

George Stoker, of London, ¹³¹_{Sept., '95} recommends oxygen kept in contact with the bald areas. The patients wear an India-rubber high hat filled with pure oxygen through a tube communicating with it.

M. A. Martin ¹⁰⁰_{July 9, '95}; ⁶⁷³_{Sept., '95} recommends tattooing of the affected area, which has previously been covered with a solution of corrosive sublimate in glycerin, 1 to 100, with four needles solidly mounted on a handle, or with the instrument used by oculists for tattooing the cornea. The punctures need be only slight, but sufficient to permit the penetration of the antiseptic solution into the skin. They may be frequently repeated, as the wounds are but slight and soon heal. The author has had successful results in the most inveterate cases.

Sabouraud ²⁴⁵_{Sept., '95} states that: 1. Alopecia areata is essentially a

recurrent affection; it recurs in about one-half the cases. 2. It is not a disease of the hairs, but a tegumentary affection. Bearing in mind that if we wish to act upon the derma we must first destroy the horny layer of the epiderm, which otherwise constitutes a varnish of almost complete impermeability, the author begins by applying upon the diseased patch a layer of the vesicating fluid of Bidet, and the following day, after having removed the blister, he applies upon the denuded chorium a 15-per-cent. solution of nitrate of silver, with or without cocaine anæsthesia. If necessary, he renews these applications at the end of ten or fifteen days. The results are reported as far surpassing those following other procedures.

Brocq, of Paris, ²⁴⁵_{Sept., '95} and Gautier experimented with the procedure advised by the latter for this affection,—*e.g.*, cupric electrolysis. They have reached the conclusion that the method does not give results which permit of its being advocated. The passage of the current and the decomposition of tissue are painful; there remain small wounds which leave deep cicatrices, depressed at the points where the needles have been applied. The hairs do not seem to grow in any noteworthy manner about the points of operation, and the onward march of the disease has not been arrested in a sufficient number of cases to warrant its being considered as an efficacious treatment. Brocq ²¹²_{Sept. 10, '95} also states that syphilitic alopecia almost always disappears spontaneously or under the influence of general treatment. It may, however, be well to increase the activity of the new growth by local treatment. Every other day frictions should be made with

R Perchloride of mercury, . . . 0.50 gramme (7½ grains);
Cologne water, . . . 25.00 grammes (8 fluidounces);

supplemented twice a week by the following ointment:—

R Yellow oxide of mercury, . . . 1.00 gramme (15 grains);
Pure vaselin, . . . 25.00 grammes (6½ drachms).

Alopecia Universalis.—Morton ¹⁵⁷_{Sept., '95} presented to the Brooklyn Dermatological Society a case of universal alopecia in a female aged 20 years. Health and all her functions were normal, excepting that she was excessively nervous, especially at the menstrual period. About three years ago her father was killed by an accident and she was completely prostrated by the shock. In a few days her hair began to fall out in patches. This alopecia continued until there was complete denudation of the hairy portions of the body. The author had taken pains to exclude syphilis, trauma, or any other cause that might produce this condition, and he showed the case as one illustrating an alopecia from nervous shock.

Stowers⁶⁹⁷_{Apr., '95} showed a girl, aged 13 years, who during the previous nine months had developed a complete alopecia of the scalp, commencing over the left parietal bone and wholly unassociated with injury or accident. The history of the case was that it had occurred spontaneously, without pain or subjective disturbance of any kind, and not preceded by any parasitic disease. Careful attempts had been made to discover fungus, but without success. A somewhat curious feature was that the eyebrows and eyelashes were unusually full and strong, and that dark, pigmented hairs existed, uniformly arranged, over the whole of the upper lip.

Jonathan Hutchinson, of London,¹⁰⁷⁷_{Nov. 28, '94} also showed a boy, aged 8 years, an example of complete alopecia at an unusually early age. His baldness was absolute so far as the scalp was concerned. His eyebrows were also lost, and his eyelashes were very small. The history given was that at the age of 3 years the hair began to fall in round patches, and that in the course of a year the baldness was complete.

Rille, of Vienna,⁶_{June 22, '95} showed a patient affected with alopecia and scleroderma who had completely lost the hair from all parts of his body. The scleroderma is distributed as follows: On the right lower extremity, from the crest of the ilium to the edge of the sole of the foot, the skin is diffusely and symmetrically thickened and permeated by numerous yellow, pigmented spots. Around the knee the skin is thinned and without pigment, being also in an atrophic stage. A central, trophic disturbance is supposed to have caused these conditions. The alopecia has existed for four years and began with the form of area Celsi; the scleroderma has existed for three years. Recovery is doubtful, though Michelson has known it to occur even after sixteen years. Leslie Phillips²_{Mar. 30, '95} also recorded a case in which scleroderma simulated alopecia areata.

Hugh R. Beevor, of London,²_{July 13, '95} mentions the case of a man suffering from universal alopecia. He was treated with thyroid extract and, after taking 5-grain (0.32 gramme) tabloids three times a day for ten weeks, no further loss of hair of moustache and eyebrows was evident, and it did not readily pull out. The scalp was shaved, so that it is difficult to state what change occurred; the shaved hair where present was hardly grown at all, but there was a good deal of downy hair. The patient was taking at the same time liquor strychninæ. Hector W. G. Mackenzie, in reply to the above,²_{July 20, '95} stated that he had given the thyroid treatment a full trial in both universal and partial alopecia, and had been unable to observe any beneficial effect therefrom. The remarkable results of the thyroid treatment in curing the baldness

of myxœdema at once suggested to him, as no doubt it did to others, a trial of the same treatment in baldness due to other causes. This treatment he had carried out in a number of cases between two and three years ago.

[I cannot too strongly warn the reader against placing too great confidence in the marvelous results obtained recently, in numerous dermatoses, from the thyroid treatment. The subject requires considerable control study before these results can be accepted.—L. B.]

George T. Jackson ²⁴⁵_{Sept., '96} presented to the New York Dermatological Society a case of traumatic alopecia. The patient was a male, aged 24 years, a musician. The disease began four years ago as an itching of the right eyebrow, for the relief of which the patient scratched and soon the hair began to come out. When the patient came under observation, some months ago, the right eyebrow was completely bald; this condition, he said, had existed for two years. The skin was reddened, thickened, and scaly. Roots of hair showed through the thickened skin. The patient was of a nervous, excitable disposition. He was given a 40-per-cent. tincture of the oil of cade, and under this treatment the redness and thickening was somewhat reduced and the itching less severe. Some hairs afterward appeared in the outer part of the eyebrow.

George T. Elliot also referred to a case, coming under his observation, in which the hair of the head and of both eyebrows was rubbed off on account of a pruritus, general in character.

Angioma.—A. Pilliet, of Paris, ⁷_{Dec. 28, '94} examined about fifteen small cutaneous tumors taken from the face, and the diagnosis of which was angioma. With the exception of those tumors which had grown upon the lips or under the nostrils,—and, consequently, on dermo-mucous membranes,—they were hardly ever pure angiomata, but were more complicated tumors. Some were found containing a considerable amount of adipose tissue, whose apparent volume was much greater than that of the vessels; others were clearly formed around sudoriparous glands; others—in the temporal or frontal regions, for instance—had developed among the muscular fibres of the cutaneous muscles. A common trait of all these tumors is their infiltration with small round cells, which brings them near to molluscum and non-malignant cutaneous sarcoma. The small round cells are placed in lines situated around open blood-vessels which are larger than ordinary capillaries, but without a connective-tissue wall. The adipose tissue, muscular tissue, and the various other tissues which are inglobed in the angiomata are all hypertrophied likewise, which adds to the

apparent complexity of the tumors, but it is only a secondary phenomenon. The capital point is that the majority of the angiomas in childhood are fleshy angiomas whose vessels have developed in the midst of masses of small round cells analogous to those of molluscum and of cutaneous sarcomata. The term of "angiosarcoma" is, consequently, the only one which is exact from an histological stand-point; but it must be admitted that such sarcomata are non-malignant, that the angioblastic tissue of which they are formed is finally organized into adult vessels.

Atrophy.—Bronson²⁴⁵_{Jan., '95} describes the case of cutaneous atrophy of the extremities shown in the annexed colored plate. The patient, a man 45 years of age, had noticed, fourteen years before, that the skin of his left ankle was becoming thinner and more sensitive, the blue veins being more marked. The same changes gradually appeared in the other limb and in the arms, while the affection became more extensive on the leg originally affected. The only subjective sensations complained of were occasional slight pains running through the limbs and a sense of great fatigue after long standing. The color of the affected regions was a purplish brown, due to the blood-vessels showing through the skin, which contained a sort of brown pigment. The skin was wrinkled and glazed, the veins being more distinct than normally. Shallow, indolent ulcers were present near the outer malleoli of both legs. On the legs, hands, and feet were white scars where the atrophy had been most profound, or in some cases where ulcers had previously existed. Hairs had almost disappeared from the affected regions, and local sweating could not be detected.

Bulpius.—This is the name of a hitherto undescribed skin disease, endemic in Central America, which is described by Otto Lerch.¹⁰⁹_{June, '95} The name is derived from "butny," meaning, in the language of the Mosquito Indians, "spotted," and "piss," meaning "gray." Several varieties of the disease have been observed, two of which are very distinct. Other types seem to be mixtures of the two. The disease has not been observed at birth, but a few months after birth, up to the time of death, the disease may attack any individual, strong or weak, old or young, male or female. Cases in early infancy are rare. Generally, the disease commences on the extremities, the feet and hands particularly, gradually spreading. After this the lesions are most frequent around the knees, abdomen, neck, and face. There seems to be no disturbance of the general functions of the body. The lesions appear as crops of minute, reddish papules, which break up and gradually disappear, leaving a discolored spot. The pigment



Symmetrical Cutaneous Atrophy of the Extremities (Bronson)
Journal of Cutaneous and Genito-Urinary Diseases

finally disappears, leaving behind a dirty-white lesion,—whitish in the centre, surrounded by a partly discolored and slightly elevated broad margin. These patches are round or oval in shape, with irregular border. The two varieties of bulpiss are black bulpiss and white bulpiss. In the black variety the lesions have a greasy, black color, the affected skin having the appearance of Indian paint. Here the patch gradually dies and shrivels. In the white variety the lesions are as above described, and continue dry and scaling. There are no subjective symptoms except when the disease appears. Then itching is felt after bathing at night. It does not appear that the disease is hereditary, but it is undoubtedly contagious. It is asserted by these people that, for the sake of revenge, one afflicted with the disease will scrape off the scales, etc., and mix them with the food or drink of the enemy, who immediately contracts the disease therefrom. The treatment commonly employed is the red oxide of mercury in ointment, suggesting the parasitic nature of the disease.

[It is impossible to say to what this affection corresponds and what may be its nature. Here is still another subject for investigation.—L. B.]

Chilblains.—The following treatment is recommended by Besnier¹⁰⁰: The affected parts are bathed in a decoction of walnut-leaves, then dried and rubbed with spirits of camphor. Salicylate of bismuth 10 per cent. in powdered starch is then dusted on. To quiet the nocturnal itching in its most active state the following mixture is applied:—

R Glycerin,	.	.	.	.	.	50.0 grammes (1 $\frac{1}{2}$ ounces).
Rose-water,	.	.	.	.	.	50.0 grammes (1 $\frac{3}{4}$ fluidounces).
Tannic acid,	.	.	.	.	.	0.1 gramme (1 $\frac{3}{4}$ grains).

The salicylate-of-bismuth powder is then used as before. If the chilblains are ulcerated they should be poulticed with walnut-leaves steeped in hot water.

Dermatitis Herpetiformis.—Gastou, of Paris, ¹⁴Apr. 21, '95 had occasion to perform a post-mortem examination in a case of dermatitis herpetiformis. The patient suffered from caries of the cervical vertebræ and showed lesions of ancient diffuse nephritis likewise. He noted the following facts: 1. Absence of bacterial specificity in the contents of the bullæ. 2. The coincidence, already noted by Brocq, of lesions of the nervous system in autopsies of cases of dermatitis herpetiformis. 3. The co-existence of bullous lesions and of nephritis. The author states that in clinical observation of dermatitis herpetiformis the condition of the nervous system and of the viscera, especially the kidneys, should be noted with care, in order to determine whether the skin, the nervous system, or

the kidneys are the original cause of the disease, and whether the latter should be treated as a simple inflammatory dermatitis, a trophoneurosis, or as if it were analogous to a real cutaneous uræmia.

Leredde and Perrin,¹¹²_{Nov., '95} who have studied the lesions of dermatitis herpetiformis as found in that variety known as herpes gestationis and in the commoner forms, state that the identity of the two forms is indisputably established by the presence in both of cells having a special micro-chemical reaction, coming from the blood-vessels of the derma and eliminated by the epidermis, and by the alteration of the blood, in which one finds a certain number of eosinophilous cells.

J. J. Mooney, of Detroit, Mich.,²⁰²_{Aug. 10, '95} reports two cases of dermatitis herpetiformis in two sisters living apart, which were interesting as showing the family tendency, the liability to onset in a predisposed person on change of climate, and the general intractability of the complaint. In both he adopted a general tonic treatment,—iron and quinine and iron and arsenic, with soothing local applications,—but the affection seemed to run its course in spite of all treatment.

Dermatitis Repens. — Stowers⁶_{Aug. 24, '95} described a very severe and persistent case. The patient was originally in the enjoyment of fairly good health, but occasionally suffered from acute gout, her father having been the subject of gouty trouble from early manhood until the time of his death. Concurrently with the dermatitis the condition known as “glossy” skin appeared and remained throughout. The affection spread toward the trunk, and at one time included the skin of the shoulders, chest, and abdomen in a lesser degree; but eventually this disappeared, leaving the hands and feet only involved. Stowers considered dermatitis repens to be best described as a spreading dermatitis denuding the epithelium by a slow process of disintegration, accompanied by irregular pustulation, discharging a serous or sero-purulent fluid, and spreading with an undermined and generally well-defined edge. The treatment of the case had proved unsatisfactory, the numerous remedies prescribed alike failing to arrest the disease.

R. W. Taylor²⁴⁵_{Apr., '95} also reported an interesting case showing the outward effect of resorcin applications. The patient was a woman, aged 35 years, who had a very weak heart and an habitual pulse of 59 per minute, and also suffered from a typical seborrhœal eczema of the entire scalp, which was leading to thinning of the hair and premature grayness. She was given an ointment of 1 drachm (4 grammes) of resorcin to an ounce (30 grammes) of cold cream. A single application of this to the scalp set up a

violent dermatitis, which extended to the ears, the forehead, and back of the neck, and proved very rebellious to treatment. The woman stated that some years ago she had used resorcin, and its application was followed by a similar experience. Jackson ²⁴⁵_{Apr., '95} said that on one occasion he prescribed resorcin ointment of less strength than that mentioned by Taylor, and its application was followed by a violent dermatitis resembling erysipelas.

[These artificial eruptions provoked by resorcin are relatively frequent, and this substance should only be used with much precaution, beginning with almost infinitesimal doses and suspending its use at the slightest irritation.—L. B.]

Eczema.—Breda, of Padua, ⁴⁵_{B.29, No.2, '94}; ²⁴⁵_{Aug., '95} defines eczema as “a superficial, non-contagious, polymorphous, pruriginous, usually chronic dermatitis, which has a tendency to spread, to relapse, and which does not leave any scars.” He specifies, as not belonging to the class of eczema, erythema, eczema marginatum, staphylococcia (Wickham), Paget’s disease, dysidrosis, mycosis fungoides (initial stage), tuberculosis cutanea, the different forms of neurodermatitis, keratoderma, eczematization of Brocq and Jacquet, eczema seborrhœicum (Unna), and dermatitis artificialis (caused by external irritations). Etiologically the author believes more or less in herpetism and arthritism as factors, besides which a certain vulnerability of the skin and disturbances of the innervation play an important part.

C. Bruhns ⁴_{July 15, '96} states that the majority of authors who have had the opportunity of observing albuminuria or nephritis during eczema attribute the renal manifestations to the action of the drugs used,—*e.g.*, to an intoxication.

Bruhns collected seven cases of more or less extensive eczema in which albuminuria and nephritis had supervened either without treatment or with a treatment (styrax, tar, balsam of Peru), and under such conditions that it would be impossible to admit the existence of any effect of the drug upon the kidneys. In all these cases a manifest relation between the eczema and the nephritis was, consequently, present. When albuminuria shows itself in connection with eczema, it is due to the fact that the patient is particularly predisposed to nephritis.

A. Neisser, of Breslau, ¹¹³_{Oct.27, '96} alluding to mercurial eczema, states that from experience lasting for years, as well as from experiments made for the purpose, he has come to the following conclusions: 1. The numerous exanthems, erythema, vesicular and squamous forms of dermatitis which occur after frictions of mercurial ointment, usually on account of phthirius inguinalis, are not caused by the mercury, but by the presence in deteriorated

ointment of turpentine, fat-acids of high acidity, and nitrobenzol.

2. There may also be in question an individual sensibility of the skin toward these substances.

Neisser does not, of course, deny the existence of real mercurial exanthems.

H. H. Morton, of Brooklyn, ¹⁵⁷_{Sept., '95} showed before the Dermatological and Genito-Urinary Society a case of eczema marginatum. The patient was a female, aged 6 months; when the child was 5 months old an eruption appeared around the vulva and gradually increased in extent, spreading peripherally. At presentation the eruption covered the vulva, anus, inside of the thighs, and well up over the abdomen. The diseased skin was bright red in color, not elevated; no scaling except at the margins, which were also slightly elevated, showing a well-marked line of demarkation. The skin in the centre of the patches appeared smooth and healthy, except for a slight redness. There were also a few small circular spots scattered over the back and thorax; these were covered with adherent scales.

William Frick, of Kansas City, Mo., ⁷²_{Aug., '95} reports two cases of eczema of the glans penis.

Hale White, of London, ²_{Nov. 17, '94} showed to the Clinical Society of London a boy, aged 10 years, who had had acute eczema of the face following typhoid fever. He had a mild relapse of typhoid, and then developed a severe eczema, which began as a few vesicles near the lip, and rapidly spread so that the whole face and ears were covered; the eyes were affected with conjunctivitis. The condition slowly subsided, and six weeks after the first appearance had nearly disappeared.

Hutchinson ²²_{July 3, '95} reports a case of eczema of the leg—the nummular form—probably due to contagion, the contagious matter having been conveyed by means of the lymph-spaces. The author remarked that eczema was contagious to the individual suffering from it, but there was nothing to show that it was contagious to other people.

Le Gendre, of Paris, ⁵⁵_{June 29, '95} reported to the Société Médicale des Hôpitaux a fatal case of generalized eczema.

David Walsh, of London, ²²_{Oct. 23, '95} in an article on gouty eczema and allied forms, states that, as is well known, many substances of a chemical or organic nature, when introduced into the blood, may irritate in turn one or all of the channels of exit from the body, as, for instance, bowel, kidney, or skin. Thus, the poison of scarlet fever may irritate every one of the excretory organs, and cause dermatitis, pharyngitis, bronchitis, gastro-intestinal troubles, and nephritis. Iodine excreted through the nasal mucous mem-

branes sets up coryza, or, if through the bowel, griping, etc. The author argues that if the theory be right the rational treatment of excretory inflammation is to relieve an affected organ by shifting the stress of elimination to sound organs. Hence, in eczema occurring in gouty persons he uses salines that act on the bowels and kidneys.

The dermatitis, however, once started, becomes complicated by the invasion or the development of numerous pre-existing or invading micro-organisms and by various hypertrophies. In recent cases mild local applications, such as creolin ointment ($\frac{1}{2}$ drachm—2 grammes—to 1 ounce—30 grammes—of vaselin), or a weak creolin lotion ($\frac{1}{2}$ drachm—2 grammes—to the pint—0.5 litre—of water), will suffice for a cure. When the dermatitis is more chronic and is marked by induration or by a crop of indolent papules, some stronger local application is needed. As to the particular saline in private practice, the author has found Hunyadi Janos water to answer every purpose. Indeed, he has come to the conclusion that the use of a natural laxative water is of special value in the treatment of many diseases of the skin and its appendages. He invariably prescribes Hunyadi Janos, partly because it can be obtained anywhere and everywhere, partly because of its uniform action, and last, but not least, because it is preferred by patients. At the outset a patient may be directed to take a full dose every morning for a fortnight or three weeks, and after that two or three times weekly for a further period of a fortnight. Then it may be discontinued, to be at once resumed, however, if there be any return of symptoms. A bold use of the remedy appears to yield the most satisfactory results.

Winternitz, of Vienna, ²²_{Apr. 3, '95} recommends the decoction of myrtle-berries for eczema, which drug had received unqualified praise from Hebra. The decoction is evaporated till it becomes a syrup. The addition of tincture of myrrh or salicylic acid does not diminish its potency. Cases of eczema which have proved obstinate to treatment yield in a short time. He quoted cases in which marked changes could be observed on the second day in chronic cases.

Menzies ¹⁴⁷_{July, '95} states that in a washerwoman with acute impetiginous eczema of the hands, who had been treated with the usual remedies without any relief, he gave thyroid extract. Twenty-four hours later the skin began to peel. Five days later the healing had progressed markedly and all the depression had disappeared.

Thibierge, of Paris, ⁶⁷³_{May, '95} recommends the following prescription in dry eczema with pruritus:—

R Menthol,	. . . . .	2 grammes (30 grains).
Resorcin,	. . . . .	1 gramme (15 grains).
Precipitated sulphur,	. . . . .	10 grammes ($2\frac{1}{2}$ drachms).
Zinc oxide,	. . . . .	15 grammes ($3\frac{1}{2}$ drachms).
Vaselin,	. . . . .	30 grammes (1 ounce).

C. E. Lockwood, of New York, ⁶⁷³_{Apr., '95} related to the Medical Society of the State of New York a case of eczema of the scalp in a man of rheumatic tendency, the rheumatism disappearing with the appearance of the eruption. This had continued for four years when he saw the patient and instituted treatment, which included the administration of salicylic acid. The scalp eruption thereupon disappeared. In the discussion, L. D. Bulkley, of New York, stated that he had used salicylic acid for years in eczema in cases of rheumatic diathesis, and had recommended it with the use of water as a diluent, the patient eating sparingly of meats. Elsner argued that in the so-called uric-acid diathesis the trouble was not due to excess, but to retention, of uric acid. He did not approve of cutting off all meat diet. The point was to see that metabolism went on perfectly, and, where it did not, the trouble might lie in a daily cup of coffee or other apparently unimportant things, instead of in meat and foods which were wholesome for most people.

Eczema Pilare.—Perrin and Aslanian, of Marseilles, ³¹_{Mar. 2, '95} conclude, from bacteriological experiments, that bacteria exist in certain quantities on the normal upper lip and openings of the nostrils in man; that the staphylococcus pyogenes albus is the customary inhabitant of these regions, and is sometimes found there alone, but is usually accompanied by the staphylococcus pyogenes aureus.

Eczema pilare of the upper lip is one of the most obstinate lesions which the physician can have to treat; consequently he must have several methods at his disposal. Three varieties of ointment seem to succeed well enough against this affection; they are mercurial ointments containing yellow oxide or calomel, styrax ointments, and sulphur ointments. They may be associated, as was done recently by Brocq ²¹²_{Feb. 10, '95} in a patient in whom styrax ointment alone had not been successful. He prescribed the following mixture:—

R Styrax,	. . . . .	5.00 grammes (1 $\frac{1}{4}$ drachms).
Precipitated sulphur,	. . . . .	0.50 gramme (8 grains).
Oil of sweet almonds,	. . . . .	15.00 grammes (4 drachms).

This preparation gave good results in the case cited.

[Another topical remedy, little known, and which sometimes succeeds in rebellious cases of folliculitis of the upper lip, is blue pyoktanin in a 25-per-cent. solution. This is applied to all the

pustules after they have been opened. I might add that in this affection the nasal cavities should receive proper attention, since it depends upon chronic coryza, or at least upon frequently-repeated attacks of that disease; the pathogenic microbe will be found in the nasal fossæ.—L. B.]

Eczema Seborrhœicum Circinatum.—This affection, which occurs commonly on the trunk, in the sternal region, and in the interscapular region, shows a semi-annular configuration which is so special that it is usually easy to recognize. It can easily be cured, but it readily recurs, being due to an alteration of the secretion. Brocq, of Paris, ²¹²_{Feb.10,'95} recommends the following ointment for this form of eczema:—

R Tannin,	. . . . .	2 grammes (30 grains).
Calomel,	. . . . .	1 gramme (15 grains).
Glycerolate of starch with neutral glyc-		
erin of Price,	. . . . .	30 grammes (1 ounce).

In this variety of eczema it is of importance that the patient should keep his skin in a state of absolute cleanliness by means of the application of soap, repeated twice a week.

[It is probably, if not certainly, a parasitic affection.—L. B.]

When seborrhœic eczema occurs on the scalp it is accompanied by much itching. Brocq often prescribes in these cases the following treatment: Wash every other day the scalp with warm water containing for every quarter of a glassful of water 20 to 60 drops of liquid polysulphide of potassium (solid potassium polysulphide, 100 grammes [$3\frac{1}{4}$ ounces]; water, 200 grammes [$6\frac{1}{2}$ fluidounces]). In order to apply the lotion the hairs are separated with a comb and the exposed scalp is lightly rubbed with a wad of cotton dipped in the solution. During the intermediate days the following ointment is applied:—

R Naphthol-β,		
Camphor,	. . . . .	ââ 0.25 gramme (4 grains).
Resorcin,	. . . . .	0.20 gramme (3 grains).
Precipitated sulphur,	. . . . .	1.50 grammes (24 grains).
Vaselin,	. . . . .	20.00 grammes (5 drachms).

Elephantiasis.—Farner, of Zurich, ³⁴_{May 7,'95} relates the case of a woman, 27 years old, who had suffered from disease of the external genitalia since her eighteenth year. The diseased portion was removed, the operation being ultimately followed by recovery. A detailed microscopical examination of the parts removed led Farner to the conclusions that the origin of the alterations could be carried back to an attack of acute gonorrhœa. Stagnation of the lymph as the etiological cause could be excluded, as only unimportant enlargement of the lymph-glands was perceptible. The gonorrhœa had given rise to chronic inflammation of the lymphatic

vessels of the vulva, which inflammation became the starting point of the tumors. In consequence of the great cell-production of the lymph-ducts the structure of the epidermis and of the corium were overgrown; they then became atrophied and disappeared little by little, either through hyaline degeneration or through formation of connective tissue. The vessels were also obliterated in this manner, and not by endarteritis obliterans.

Von Bergmann, of Berlin, ³¹_{Nov. 9, '96} reporting a case of extensive elephantiasis of the posterior region of the right shoulder, states that plexiform neuromata are observed in connection with elephantiasis, both congenital and acquired, especially with the second, and with other nervous tumors, such as multiple neuromata and neurofibromata. The pigmented and wrinkled elephantiasic tumor of the patient was composed of a bundle of nervous cords. The evolution of the affection begins by a nævus, continues with elephantiasis, and ends with a neuroma. In such cases nævi, great and small, and isolated, are usually disseminated over the remainder of the body, as in the case described. A microscopical preparation showed that the nervous lesions may begin at an early period of the disease.

Moncorvo, of Rio de Janeiro, ¹¹⁵⁹_{No. 2, '95}; ⁵_{June, '95} reports three cases of congenital elephantiasis; one occurred in the person of a rachitic child, aged 4 months, in which the affection showed itself by enlargement of the two lower extremities; the second case was one of hereditary syphilis, the elephantiasis manifesting itself upon the right foot; the third was also a case of hereditary syphilis, with the lesions localized upon the lower extremities. From previous study of this subject Moncorvo believes that the pathogenic condition of elephantiasis may be present before the birth of the child, and that the process may reach the stage of fibrous formation. In one-third of the cases of congenital elephantiasis on record the morbid process has remained limited to one portion of the body, especially to the limbs. In the other cases the disease had the soft, or cystic, form, occasionally forming subcutaneous fibromata. Areas of vascular nævus were observed accompanying cases of the second group.

Epithelioma.—Bérard, of Lyons, ²¹¹_{June 9, '95} reports a case of epithelioma of the scalp, originating from the scar of a very old burn. The observation is interesting from the uncommon location of the growth,—*e.g.*, the vertex. E. K. Dunham ⁵⁹_{Aug. 3, '95} presented to the New York Pathological Society a specimen of epithelioma following skin-grafting.

John A. Wyeth, of New York, ¹⁹_{July 27, '95} extols arsenious acid, in the form of Marsden's paste, preferring that method to treat-

ment by the knife. In cases in which the disease has existed for so long a period that the paste alone cannot be relied upon, he first cuts or scratches away the malignant process, and then applies the paste. In this way more satisfactory results are obtained than by any other treatment.

Diana⁵⁰⁵_{No. 63, '96} cured a case of cutaneous epithelioma in the parotid region by methyl-blue and chromic acid, after the method proposed by Darier.

E. G. Goodman, of El Paso, North Carolina,⁴³_{Apr. 20, '95}⁹⁰_{July, '95} claims that the green juice expressed from the leaves of *Phytolacca decandra* and made into a plaster has a specific action on epithelioma. "It has a selective action for the morbid tissue; follows out all the irregularities of the epithelioma; causes, as it were, its liquefaction and removal, and then acts as cicatrizant for the open sore." Goodman states that under this treatment he has seen large epitheliomatous masses destroyed in a few weeks, and nothing but a faint scar left at the place occupied by the growth. The remedy causes severe pain, but may be used fearlessly, as it does not endanger the patient.

M. B. Hartzell, of Philadelphia,⁸⁰_{Nov. 15, '94} says that one of the best remedies of the class of caustics is, on many accounts, pyrogallol, and it is especially indicated in the small superficial epitheliomata so commonly seen upon the face. Owing to the comparative slowness of its action, it is easy to regulate the amount of tissue destroyed, and, as it is almost or quite painless, few patients object to its employment; it produces far less inflammatory reaction in the surrounding parts than any of the caustics above mentioned. In using chloride of zinc and pyrogallol it should be remembered that the eschar, after it has attained a certain thickness, protects the tissues beneath it, and if it is desired to penetrate to a considerable depth it is necessary to remove this eschar and re-apply the caustic. This may readily be done in thirty-six to forty-eight hours by the application of lint kept wet with a saturated solution of boric acid. The author urges the more frequent use of caustics in the earliest stages of epithelioma, believing that a large proportion of cases which would refuse any operative interference would readily submit to this form of treatment and with entirely satisfactory results. (See "Tumors," vol. iii, section L.)

Erysipelas.—H. Roger, of Paris,¹¹⁵³_{Feb. 9, '95}⁶_{Mar. 9, '95} after remarking that so-called idiopathic erysipelas cannot serve to solve the problem of the incubation period, gives a table of 41 cases occurring secondary to traumatism. Five cases presented an incubation of from 7 to 18 hours, 5 of 24 hours, 9 of 1 to 2 days, 8 of 2 to 3

days. His conclusion is that an incubation of a few hours only is much more common than is generally stated in standard works. At the same time the fact that the incubation period may extend to three weeks is undoubted. These prolonged periods of latency Roger would explain by supposing that the streptococci gain an entrance at the time of traumatism, either from the wounding agent or integuments, and that a passing depressant influence—such as exposure to cold or draught—lowers the resistance of the organism and enables the streptococci to become pathogenic.

In a case reported by Zeller and Arnold,²⁰_{v.139,H.2} in a young woman of 22 years, there developed peculiar black abscesses and furuncles, as shown in the annexed colored plate. About 650 of these showed themselves in the course of fifteen months, in all parts of the body, including the scalp. The abscesses were limited to the skin and subcutaneous tissues, and varied in size from that of a millet-seed to that of a large nut. An interesting point was the formation of gas in the centre of the abscesses and the dark pigmentation present. Arnold found, upon microscopical examination, melanosis of the connective-tissue fibres, the walls of the fat-cells and of the blood-vessels, and their contents, particularly the red corpuscles. Streptococci and indefinite cocci and bacilli were found. Slight fever was occasionally noticed, but it seemed to bear no distinct relation to the abscess-formation, the patient being otherwise in good health. The case ended in complete recovery.

Chantemesse and Sainton, of Paris,³_{July 24, '95} publish an article on nervous influences considered from the point of view of the causes and effects of erysipelas. They state that among the erysipelatous patients treated in the Municipal Hospital in Paris they have several times observed the apparition of attacks of erysipelas occurring after an attack of anger. Among 303 erysipelatous women there were 37 recurrences, or 12 per cent. The cause was cold in a certain number of cases; a fit of passion in others. The on-coming of the recurrences was always sudden. Redness begins three or four hours after the emotion; at once, or shortly afterward, the temperature rises to 40° C. (104° F.) or more. A few hours allow the parts first attacked and already scaled off to be once more attacked by the affection. The recurrence lasts two days, or, more often, from four to eight days, and is usually not serious. In men recurrences are noted also in 12 per cent. of the cases; the usual cause is exposure to cold and very uncommonly a fit of anger.

R. Massalongo⁵⁸⁹_{No.229,Oct.,'94} states that among the varieties of erysipelas there is one recurring at each catamenial period, and

Fig. 2.

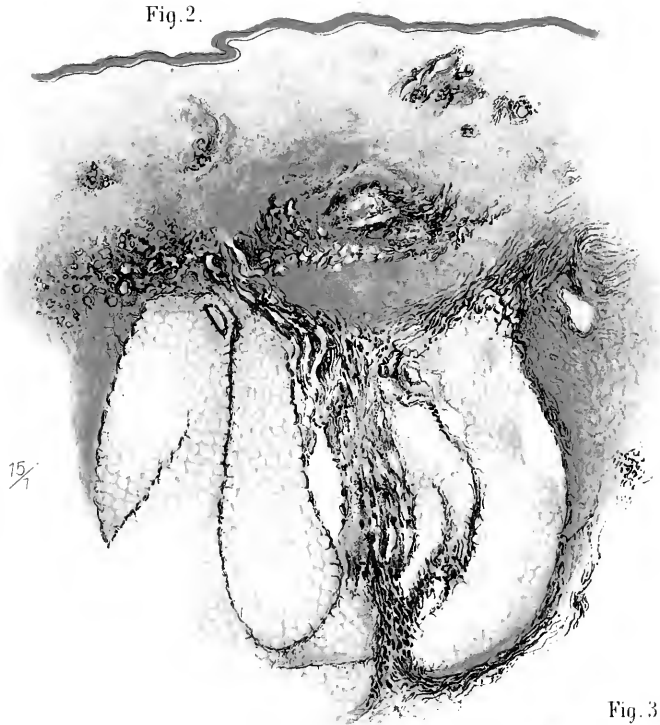


Fig. 1.

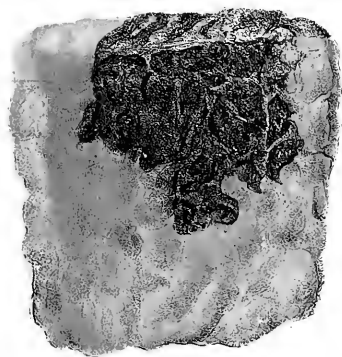
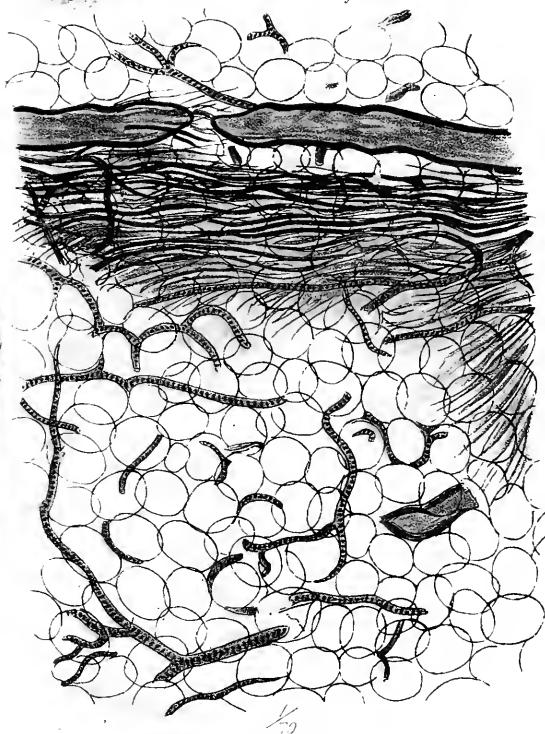


Fig. 3.



Multiple pseudo-melanotic gas-abscess of the Skin
after Erysipelas (Zeller and Arnold)

which should be called periodical catamenial erysipelas. Recurrences of erysipelas under these circumstances are explained by (1) the pre-existence of the streptococci of erysipelas in the tissues, the derma and its lymphatic vessels; (2) modification of the general nervous system and local circulatory changes (vasomotor paralysis), which are reproduced at each menstrual period, and which are favorable to the vitality, virulence, and proliferation of such bacteria.

Hessler¹⁴_{July 7, '95} states that within a period of six months he has observed erysipelas of the face and head following otitis seven times. There was otitis externa in only one case; in the other six cases there was acute or chronic otitis media, the mastoid process usually participating.

Roger, of Paris,⁹²_{Apr., '95; June 8} found that in 10 cases of erysipelas a distant lesion, apparently due to the same exciting cause as the erysipelas, was really brought about by a secondary infection with the pneumococcus. In 6 of these cases the secondary lesion implicated the lungs, in 1 the lungs and peritoneum, and in 3 the meninges, either exclusively or predominantly. In the pulmonary complication it would have been impossible to determine the nature of the process except by bacteriological examination. The author thinks that streptococcic broncho-pneumonia is rare in erysipelas. Clinical investigation cannot differentiate the different forms of meningitis, but, as regards the morbid anatomy, the pneumococcus gives rise to a more fibrinous and thick exudation, less rich in leucocytes,—namely, a dry, fibrinous meningitis,—whereas the streptococcus produces a serous or purulent meningitis; only bacteriological examination can provide certain proof. Perhaps erysipelas favors the invasion of the pneumococcus frequently present in the mouth, owing to the debilitated state of the patient. Perhaps also the microbic association may account for the peculiar evolution of these pneumonias.

Psychical disturbances coming on at the termination of the period of evolution of infectious diseases, when the temperature has become normal, or has even become subnormal, are generally uncommon; psychoses subsequent to erysipelas are exceedingly uncommon. A. Kroupetzky¹⁸⁸_{June 30, '95} reports such a case observed in the service of Wassiliew at Dorpat. With the exception of psychoses which manifest themselves at high temperatures and which evolve under different circumstances, he looks upon apyretic psychoses occurring after an infectious disease as principally due to exhaustion of the system previous to the disease.

D. Gornakowsky²⁶²_{July, '95} states that rabbits may be immunized against the streptococcus by the injection of attenuated cultures

into the peritoneum, and that their serum possesses preventive and curative properties against erysipelas induced in the rabbit and natural erysipelas in man. Two cases are reported. In this connection, Selva, ¹_{v.60, No. 26} from a clinical study of erysipelas concludes that the general infectious nature of erysipelas, and its dangers should always be borne in mind; marked prostration, cerebral symptoms, and septicæmia are not infrequent complications, and that accidental erysipelas has a curative influence upon granulating surfaces, but its use in the treatment of ulcers would be unjustifiable. (For the antistreptococcic-serum treatment see "Tumors," vol. iii, section L, and "Bacteriology," vol. ii, section J.)

Langsdorff, of Baden-Baden, ³_{Feb. 27, '95} treated thirty-two cases of erysipelas of the face and other parts of the body with compresses saturated in absolute alcohol, and reports excellent results. The painful tension of the skin disappeared in from one to two hours, and in the course of a day the temperature fell to normal. After eight to ten hours marked swelling of the skin took place, especially about the centre of the inflamed area. To prevent evaporation the compresses must be covered with some impermeable material and should be changed every fifteen minutes, until all inflammation has subsided, two or three days being generally required.

Nitchoff ⁸⁰⁰_{May, '95} draws attention to ichthyol as a specific remedy for erysipelas. He uses either a mixture of the sulphichthyolate with equal part of olive-oil or vaselin salve of the same strength. The applications should include a strip of the adjacent skin two or three centimetres broad, be repeated twice or thrice daily, and continued for three or four days after the temperature has returned to the standard. The parts are kept constantly covered with cotton-wool.

Juhel-Rénoy, of Paris, ⁶⁷_{Feb. 28, '95} uses a mixture of 3 parts of ichthyol to 10 parts of traumaticin, from which he afterward removes the excess of chloroform, as an abortive treatment of erysipelas. The method consists in circumscribing the exanthem at the limiting line and somewhat beyond by applying with a brush a band of traumaticin two centimetres in width on the face, circumscribing the ear if it be attacked or threatened. The band should be four centimetres wide on the trunk and limbs.

According to the author, this method causes the abortion of erysipelas sixty times out of a hundred, or causes it to last but half its usual length of time. W. H. Delrett, of Cincinnati, ¹⁰⁹_{Aug., '95} also states that erysipelas can be aborted by means of ichthyol. In eight cases treated by him the average duration was a little less than four days. Five of the eight cases were facial, the remaining

three of the lower extremities. The following formula was used in each individual case:—

R Ichthyol, $2\frac{1}{2}$ drachms (10 grammes).
Flexible collodion, $1\frac{1}{2}$ ounces (50 grammes).

This is applied every three hours, always commencing the application about one inch beyond the line of demarkation between the healthy and inflamed skin. The latter is an important feature of the treatment. Zelewsky¹¹²_{V.7, p.455, '95} reports that he has found ichthyol efficacious in every form of erysipelas. In his opinion it is superior to all other remedies.

T. J. McGillicuddy, of New York,¹⁴⁴_{Jan., '95} states that an efficient and thoroughly antiseptic and anodyne treatment being undoubtedly indicated in this disorder, the soapy, alkaline, cleansing properties of kretol make it especially valuable.

L. Tcherné Khovsky²⁴_{July 7, '95} has used mercurial ointment in about one hundred cases of erysipelas of every degree of severity and at every moment of evolution. He usually rubbed in from 4 to 15 grammes (1 to 4 drachms), being careful to apply it not only over the affected part, but also two finger-breadths beyond. The frictions were not painful. No complications were noted, provided care was taken to wash out the mouth with a potassium-chlorate solution. The fever was treated with 0.90 gramme ($13\frac{3}{4}$ grains) of sodium benzoate daily. All the cases treated with mercurial ointment recovered. The writer calls attention to the fact that mercurial ointment is the most active of all mercurial preparations against erysipelas.

Erythema.—The erythema produced by antipyrin may assume the most varying appearances. Brocq, of Paris, has called attention to the variety characterized by a single infiltrated and elevated patch, recurring in the same spot whenever the patient takes a dose of the drug. Dubrenilh²¹²_{Oct.10, '95} quotes a new case,—that of a patient who had on the left cheek a rounded patch fifteen millimetres broad, pale red, somewhat pigmented, elevated, and with well-limited edges; the infiltration was deep, diffuse, and easily seen; there was neither oozing, desquamation, nor alteration of the epidermis. A second patch on the forehead, somewhat to the left of the middle line, presented about the same form and characteristics. There was neither pain nor itching. The lesion recurred almost every time that the patient took a dose of antipyrin, usually 1.50 grammes (24 grains). Brownish maculæ remained on the spots affected long after the erythematous lesion had passed.

Martin Brasch¹¹⁶_{Nov., Dec., '94} ¹²⁶_{Apr.15, '95} states that antipyrin, in some individuals, provokes eruptions differing widely from the average

type of drug eruptions. They begin by a sensation of pruritus, to which succeeds an inflammatory œdematous tumefaction. The usual localities of such eruptions are at the union of the skin and a mucous membrane,—eyelids, lips, nose, glans penis, anus, and external auditory canal. The fingers and the scrotum may be secondarily affected. Congestive œdema may be the only manifestation, but usually vesicles are formed, especially on the lips, tongue, soft palate, mouth, pharynx, etc. The appearance and evolution of the vesicles vary according to their seat; they are precocious on the mucous membranes and backward on the skin of the trunk and of the extremities. They burst rapidly on mucous membranes, slowly on the penis, and often not at all on the skin, where recovery occurs by drying up and desquamation, while in the mouth they give rise to ulcers covered with a fibrinous deposit. They cause no cicatrices and rarely any pigmentation. If no vesicles are formed on the mucous membranes, there follows a catarrh with muco-purulent secretion (nose, conjunctiva). The affection lasts from two to three weeks.

In *La Presse Médicale* of February 16, 1895, a rare eruption caused by antipyrin is recorded. ⁸⁰ July 15, '95 The patient, aged 30 and very fat, was seized with violent, even unbearable, pains in the head while at his doctor's residence, for which 15 grains (1 gramme) of antipyrin were given. His urine contained a little sugar (225 grains—16.65 grammes—in the twenty-four hours) and traces of albumin. He also presented an old and obstinate psoriasis in the seborrhœic regions (scalp), scrotum, gluteal folds, palms of the hands, umbilicus, etc. Exactly four to five minutes after the ingestion of the remedy he was seized with tinglings over the whole body, then a desire to scratch himself. His face became red, his eyes filled with tears, a keen sensation of heat was experienced, and his pulse noted 120 to 130 pulsations; at the same time red patches appeared on his neck, then on his back. The next day, after a sleepless night, there was the same febrile state, the same pruritus. The eruption at its height consisted of a collection of plaques of a bright, inflammatory redness, scattered at all points of the body, without special localizations, without marked symmetry. In general round in shape, these plaques were mostly of the size of a 5-franc piece. They formed a slight relief, and in their neighborhood the skin was perceptibly hotter. Taken between the finger and thumb, these lesions, in no way painful, gave the sensation of a pretty deep thickening of the skin; their evolution was rapid. On the second day after the febrile state had disappeared the itching diminished progressively, to disappear on the eighth day. Most of the plaques grew pale,

became covered with slight scales, and disappeared in fifteen days. Some of the largest ones presented in their centre an epidemic upheaval (abortive bullæ) and were a little longer in disappearing. The patient afterward stated that years before a dose of antipyrin had given him similar trouble. The eruption described differed from a nodose polymorphous erythema in the abruptness of the onset, the tingling and pricking over the whole cutaneous surface, in the itching preceding the eruption, and in the eruptive elements being more numerous, less prominent, painless, and with rapid evolution.

In this connection, Morel-Lavallée, of Paris, ¹⁴_{v.9,p.392,'95} called attention to the indelible pigmented patches following antipyrin erythema. The pruritus is intense, the patches discrete and non-symmetrical, attacking the places where the clothes press the skin. The form is oval with the long axis placed transversely. In the beginning the appearance is erysipelatous, changing to vesicular; then desquamative, when it becomes blackish; at last it becomes fawn-colored and remains so. The exhibition of the drug causes a renewal of the symptoms.

The diagnosis of the lesion may be difficult, as it stimulates mucons plaques in the mouth, measles, syphilitic roseola, psoriasis palmaris, syphilitic pigmentation, morphea, etc. Verrières remarked that old preparations of antipyrin produce eruptions readily, whereas the drug when freshly prepared does not do so.

Friedheim ⁶⁹_{p.182,'96} reports a case of exanthem following on the use of digitalis. The patient took 3 teaspoonfuls of tea with some tincture of digitalis and valerian every day for a week, when there appeared on his back, thorax, and abdomen, an eruption in the form of papules on a dark base, the papules were disposed in groups, and the skin surrounding each group was erythematous. During the same time a crop of furunculi came out. The rash lasted for fifteen days. Digitalis is rarely followed by a rash.

D. Robertson Dobie, of Coldstream, ⁶_{Sept.28,'96} reports a case of aggravated iodide rash induced by the local application of iodine liniment to the skin of the back, which throughout remained in a healthy, unbroken condition.

Elliott ²⁴⁵_{Mar.,'95} observed a crustaceous, pustulo-fungating eruption due to potassium bromide in a child who had primarily received 15 drops of syrup of ferric iodide three times daily for a month; this produced an erythematous iodine eruption, followed by an iodine acne. The physician in charge then gave her bromide of potassium, beginning with $2\frac{1}{3}$ grains (0.16 gramme) three times daily and increasing it up to $12\frac{1}{2}$ grains (0.80 gramme) every four hours,—about 80 grains (5.3 grammes) per day.

O. Rosenthal⁴_{Nos. 23, 24, '95; July 27, '95} mentions folliculitis as occurring from the external use of mercury. The lesion consists in hard, red nodules separated by normal or slightly reddened skin, which may suppurate owing to secondary infection. An erythema and eczema may also result from the local action of mercury. The latter may either be papular, vesicular, pustular, or moist. In severe cases there may be a marked exfoliative dermatitis, of which the author relates a case. The mercurial erythema may resemble the rash of measles or scarlet fever. When it results from the local action of mercury it starts from the site of the inunction. The most serious mercurial eruption is that resembling pemphigus, of which the author also relates a case. Mercurial eruptions have a polymorphic character, and the mucous membranes may be affected in the same way as the skin. Mercury administered by the mouth or by subcutaneous injection, etc., may give rise to these eruptions, but not as often as inunction does.

Cathelineau, of Paris,⁹⁹⁶_{Apr. 10, '95} alludes to the accidents induced by hair-dyes. The preparations of lead or of nitrate of silver used until recently to dye the hair and beard have lately been replaced by a solution of paraphenylenediamin hydrochlorate used under a variety of names. This substance is apt to cause accidents, of which the following is a typical example: A young woman allowed a few drops of the solution used to dye her hair black to fall upon her left cheek. In order to remove the mark she was obliged to exert much friction. Next day she experienced intense pruritus, which extended to the whole face and scalp; two or three days later she suffered from erythema of the face, with œdema of the eyelids, extending as far as the ears. There were some patches on the arms and legs, too. Some days later all had vanished. Usually such forms of erythema are quickly over. Brocq states that it is not always the case, however, and that in some patients this dermatitis is the starting-point of generalization to the entire body, lasting five to six weeks, and recurring at each new attempt.

Favus.—Bodin,²⁸⁷_{No. 11, '94} states that, among the etiological factors, contagion, mediate or immediate, occupies the first place, transmission from the animal, however, occurring much less frequently than from man. The saprophytic existence of the achorion is possible, and man may meet with it free in nature. A careful examination of the elementary lesions shows that, notwithstanding its divers forms, the disease is always the same, the differences which separate the clinical forms being due to accessory characters.

The study of cultures of the achorion demonstrates that (1)

the culture-medium plays a most important rôle, and unless this is recognized the results to be obtained may lack experimental exactness; (2) in the cultures of the achorion, as in those of the trichophyton with large spores, cryptogams are found in four-fifths of the cases. The associated fungi do not play any pathogenic part.

Undeniable varieties of the achorion exist. They are not numerous, and are closely related, but they seem absolutely distinct from one another. In fifty cases of favus the author found five varieties of fungus, as follow: (1) the achorion Schönleini, as described by Kral; (2 and 3) two undescribed varieties; (4) the achorion enthytrix of Unna; (5) the achorion atakton of Unna. The true form of fructification of the achorion is as yet unknown, and its place in the classification of the fungi remains yet to be fixed.

Having observed in culture experiments that the fungus of favus is very sensitive to high temperatures, Zinnser⁴⁵_{B 29, H. 1}¹¹²_{July, '95} has employed heat in the treatment of this disease in the following manner: The scalp was covered with a compress wet with sublimate solution 2 to 1000, and upon this was placed a series of Leiter's tubes through which water, at a temperature of 60° to 65° C. (140° to 150° F.), was allowed to flow. This application was made daily for twelve hours at a time during eight days; the treatment was then suspended and the patient's scalp examined from time to time to ascertain whether there was a re-appearance of the fungus, which had entirely disappeared. In three out of four cases treated in this manner a complete cure was obtained.

Frost-bite.—Hermance,¹¹⁹_{Mar. 9, '95} as a result of treatment applied to thirty cases of frost-bite, draws the following conclusions: 1. That of the drugs employed ichthyol gives most relief from pain, and seems to protect the part as well as other applications. 2. That when the parts become raw and exposed acetanilid ointment is by far the best dressing, preventing suppuration and promoting a quick granulation and rapid formation of new skin. 3. That there are a certain number of cases in which the destruction has been so great, and the disturbance of the vasomotor mechanism so serious, that treatment fails, and nothing can be done except to wait until nature throws off the destroyed tissues, assisting in the meantime by keeping the parts clean.

Herpes Zoster.—J. MacFarland Winfield, of Brooklyn⁶⁷³_{Apr., '95} examined the blood for the malarial parasite in seven cases, thought to be of malarial origin, coming under his observation. In three there was unmistakable evidence of malarial poisoning, as demonstrated by the plasmodium malariae. In another this

test had been rendered nugatory by the previous administration of quinine.

Ebstein²⁰_{B.139, II.2} reports a case of herpes zoster with facial paralysis and another with sensory disturbances. He agrees, with Recklinghausen, that there is a primary affection of vasomotor nerves, the vaso-dilators being irritated, and looks on the herpes as an intense angioneurotic disturbance which may be associated with diseases of the motor or sensory, spinal or cerebral, nerves. The rare appearance of herpes in cases of motor disturbances, and the cause of the paralytic phenomena in motor nerves and of symptoms of irritation in sensory and vasomotor nerves, cannot be explained. In most cases the disease results from causes acting on the body in general, though trauma and cold may assist. It is possible that infection or auto-intoxication plays a part. The tendency of certain parts of the nervous system to herpes zoster may be due to predisposition of these parts to the special exciting causes.

A case of herpes zoster of the left arm, complicated with phenomena similar to those produced after lesions and cicatricial irritations of the radial nerve, is reported by Kaposi, of Vienna.³¹_{July 2, '96}

Antony Roche,⁶_{Oct. 18, '94} referring to zoster from a physiological point of view, states that he has been struck with the frequency of its occurrence after some cause that produces mental depression or anger. This, he says, has been noticed by others, and he cites Batman and Schwartz as having recorded such instances. He himself has noted the following cases: 1. A woman suddenly received the news that her husband had been ordered to India, and the next morning the eruption appeared on her left side. 2. An old man learned that a firm in which he was interested had failed, and that evening he noticed the spots on his left side. 3. A woman was much distressed at the sudden illness of her son, and on the following morning the eruption was found to have appeared. 4. A child, 6 years old, of remarkably equable temperament, was sent to bed for disobedience. She cried very much, and the next morning the eruption was noticed on her left side. 5. The author was recently consulted by a woman whose only son was shortly to be married. She complained of pains in her left side and of an eruption, which turned out to be that of zoster. She herself ascribed the rash to grief at the idea of parting with her son.

Cantrell¹¹⁹_{Sept. 14, '96} states that the first lesions to appear are not always in regions nearest to the nerve-centres, but occasionally they appear at some remote point. In many cases the disease runs

its course without developing any distressing symptoms. J. L. Gibson ²⁶⁷ _{May 15, '95} observed a case of herpes zoster attacking the region of the auricle and accompanied by paralysis of the auditory and facial nerves.

A case of bilateral herpes zoster of the fifth pair is reported by C. E. Douglas. ² _{Apr. 13, '95} A bilateral case is also reported by Geo. Carpenter, of London. ⁵¹ _{Feb., '95} J. R. Bradford, of Liverpool, ⁶ _{Oct. 13, '94} gives an account of a case affecting the frontal and dorsal regions simultaneously. A case with long-persisting neuralgic pain and Bell's paralysis is cited by G. A. Van Someren, of Edinburgh. ⁶ _{June 1, '95}

H. Hallopeau and J. Damany, of Paris, ¹⁴ _{Nov. 21, '94} showed before the Société Française de Dermatologie et de Syphilographie a patient suffering from abnormal zona complicated with gangrene. They stated that this case proves that zona of the face may be accompanied by massive gangrene extending from the centre and affecting the subcutaneous tissue as well as the skin.

W. Dubreuilh ¹⁸⁸ _{June 15, '95} showed before the Société de Médecine et de Chirurgie of Bordeaux a patient suffering from a recurrence of zona. The patient was 9 years old when she was attacked for the first time; the second time she was about 50. There could be no doubt as to the nature of the eruption. The cause of these two attacks of zona, appearing on the same side and so far apart in time, could not be ascertained.

From the therapeutic point of view two elements must be distinguished in zona,—the eruption and the pain. Albert Robin advises ⁶⁷ _{Oct. 30, '95} to always begin the treatment by giving a saline purgative,—sodium sulphate especially. One indication must be predominant in the local treatment of the eruption; the region affected must be maintained absolutely dry. To accomplish this it may be covered with cotton wadding sprinkled with the following powder:—

R Starch,	.	.	.	.	.	60 grammes (2 ounces).
Zinc oxide,	.	.	.	.	15 to 20 grammes (4 to 5 drachms).	
Camphor-powder,	.	.	.	1 to 3 grammes (15 to 45 grains).		
Powdered raw opium,	.	.	.	1 gramme (15 grains).		

In old people the eruption must be watched with care, in order to avoid, if possible, the ulceration of the zona, which would increase the severity of the prognosis.

For the neuralgia which precedes and accompanies the eruption the following pill is recommended:—

R Extract of datura stramonium,	.	.	.	0.010 gramme ($\frac{1}{8}$ grain).
Extract of hyoscyamus,	.	.	.	0.010 gramme ($\frac{1}{8}$ grain).
Extract of belladonna,	.	.	.	0.005 gramme ($\frac{1}{12}$ grain).

M. For one pill.

Sig.: Four pills to be taken daily.

If the pills do not cause a noticeable improvement and sensibly diminish the pain, antipyrin should be given internally.

For the neuralgia following the eruption antipyrin should be administered in hypodermatic injections. Hypodermatic injections of glycerophosphate of sodium may also be tried.

Kaposi, ²²_{Jan. 16, '95} in his treatment of herpes zoster, recommends local sedatives to the vesicles when the case is typical. The contents of the vesicle are absorbed, leaving the dry cuticle to cover the papillary bodies as a protection against pain. He applies a thick bandage over a dusting-powder composed of amylum, or amylum and opium, to reduce pain and keep the part dry; a layer of wadding is placed over these.

In zoster hæmorrhagica, or where the vesicles are closely set, the affected parts must be carefully protected lest they be torn. With this object in view he prescribes

R Boric acid,	.	.	.	.	.	5.0 grammes (75 grains).
Glycerin,	.	.	.	.	.	q s. to make a solution.
R Simple ointment,	.	.	.	.	.	150.0 grammes (5 ounces).
Cocaine or extract of opium,	.	.	.	.	.	1.5 grammes (22 grains).

When local treatment will not suffice, subcutaneous injections may be resorted to.

In cases of gangrenous zoster the arrest of destruction should be aimed at. He admits difficulty in such conditions, and affirms that he has seen cases maltreated with iodoform, drying the vesicle and allowing the erysipelas to set in, with serious consequences; or in other cases, where the cuticle has been removed, dressing with carbolic acid, which has also produced bad effects.

In cases in which neuralgia is a complication Fowler's solution is invaluable.

Hydroa.—Graham, of Toronto, ⁵⁹_{Oct. 12, '95} in a paper on hydroa æstivale, recorded two cases of this peculiar and rare affection occurring after exposure to sunlight. In the first a few small red spots appeared upon the face and hands of a young girl. These recurred as soon as she began to go out of the house, and the lesions became vesicular and pustular. These became black in the centre and umbilicated, followed by crusting and subsequent scarring. No spots appeared on the hands when gloves were worn. At times the face was much swollen.

The second case, also in a young woman, was quite similar, the eruptions occurring after twenty minutes' exposure to the sunlight. Malaise, coryza, sleeplessness, and anorexia accompanied the attacks. The skin was at times fissured and scaly, as in chronic eczema.

A case of hydroa vacciniforme, or Hutchinson's summer

eruption, was shown at the Medico-Chirurgical Society of Edinburgh by Allan Jamieson. The patient was a well-grown girl of 7 years. There is no history of a similar or, indeed, of any skin disease in the family or relatives. Limited to the exposed parts,—the face, hands, and wrists,—it had begun two years before, and, though worst in the warm months and subject to exacerbations and remissions, it has never wholly disappeared. Two cases of hydroa vacciniforme seu æstivale are published by Juliano Moreira, of Bahia, Brazil. ⁶⁹⁷
June, '95

Hydrocystoma.—James Adams, of Hamilton, ⁶⁹⁷
June, '95 in an article on hydrocystoma, recounts this recently described disease as follows: "The eruption consists of discrete vesicles having a pearly look, like boiled sago-grains; in size, varying from a pin-head to a barley-corn; in shape, spherical, except, as very rarely happens, two are so closely set that they seem to have coalesced. In slight cases there may be only a few vesicles; in marked cases there are hundreds, often closely set and decidedly disfiguring. Limited to the face, the eruption is worse not on, but around the nose and in the adjacent folds; next, on the temples and upper lip. I have not seen it on the lower jaw. It has no tendency to be unilateral. To touch, the vesicles are painless and surprisingly firm, being evidently deeply set. The epidermis over them does not appear thickened. When pricked they exude a clear, watery fluid, which reddens blue litmus. They then refill with blood or, especially if quite superficial, simply collapse. The vesicles are most numerous, most prominent, and most pearly in appearance during free perspiration; in a day or two after such perspiration ceases they diminish in size and the smaller of them may quite disappear. Hence, the eruption is less marked in the morning than in the afternoon, in winter than in summer; during winter it may entirely disappear. In long-standing cases, however, many of the vesicles never disappear. Cysts that might be thought to have quite gone can often be seen by viewing the surface obliquely, and may be more readily felt than seen."

Jonathan Hutchinson ⁶⁹⁷
May, '95 records a case in which the cysts were much more abundant on the right side than on the left. Alexander Morton, of Glasgow, ⁶⁹⁷
Aug., '95 reports a typical case.

Ichthyosis Hystrix.—Frank J. Thornbury ^{170 51}
No. 34, p. 136; Aug., '95 publishes a very exceptional case of ichthyosis hystrix which he saw in Kaposi's clinic, in a child 4 years of age, in which the body and extremities were completely covered with veritable spines of horny growth. Most of such cases are congenital, and in one instance a whole family, composed of several members, were affected with this disease. They traveled all over Europe, at the beginning of

the present century, as objects of curiosity, and were known as the "porcupine men." The name of this family was Lambert. The individuals actually resembled porcupines, as did the child in this report. The epidermal accumulations upon these patients sometimes reach the height of a centimetre, and may be still larger. Extensive desquamation is usually in progress, and the bed in which the patient lies is found covered with scales and broken-off masses of horny substance.

Cabot, of Boston, ⁵⁹_{July 6, '96} reports the case of an infant, 14 months old, suffering from congenital ichthyosis. This child was born at seven months, the mother being four days in labor, with gushes of a watery fluid accompanied by uterine pain every half-hour, with dribbling between the pains, about two gallons of fluid escaping when the membranes ruptured. At birth the child presented a ghastly appearance, being perfectly dry, its nostrils closed, while the mouth and eyes were opened, and apparently fastened in this position; it was necessary for the attending physician to make an incision into each nostril, through which the child might breathe. The treatment consisted of linseed-oil applied internally and externally and boric-acid solution. The case was interesting owing to the length of time during which the child lived. It finally developed bronchitis and died.

J. W. Neptune ¹⁰²_{v. 7 p. 75, '96} also records a case of congenital ichthyosis. When the child was born there was a red spot about the size of the thumb-nail on the outer surface of the leg, about midway between the knee and the ankle. From this lesion the disease had spread over the entire body.

Max Joseph, ¹¹⁵³_{June 15, '96} basing himself upon the clinical examination of a patient and the results of a rigorous histological control, considers himself justified in affirming that the affection described of late years as acanthosis nigrans, akrokeratonie hereditarium, and papillary and pigmentary dystrophy is merely an abnormal manifestation of ichthyosis; while the dermatosis known as Darier's disease, though presenting a great clinical analogy with ichthyosis, is incontestably removed from it by the anatomical character of its lesions.

Jeanselme ¹⁵²_{v. 41, p. 742, '96} reports three cases of ichthyosis in a family where there were father, mother, and four children. The three younger children were affected not markedly, but the lesion was distinctly that of ichthyosis. The mother stated that she had lost a child who had exhibited the same condition of the skin. The father, mother, and oldest child were well.

Carini ⁵⁰⁷_{v. 30, No. 1} reports an attenuated form of sebaceous ichthyosis, or seborrhœic dermatitis, which he considers analogous to a case

described by Grass and Torök under the name of "laminar exfoliation of the skin in the newborn."

Impetigo Herpetiformis.—Dauber ³_{Nov. 7, '94} states that the etiology of this affection has not yet been clearly defined; some authors consider it a process of a pyæmic nature, while others consider it as a dermatosis of nervous reflex origin. Dauber is inclined to regard herpetiform impetigo as an acute or chronic infectious malady, in which pregnancy, when existing, merely forms a predisposing cause.

An authentic case of herpetiform impetigo is reported by Bernard Schultze ⁴⁵_{B. 30, H. 1, '95} in a woman having been attacked by the disease for the first time at the end of her sixth pregnancy. The eruption was in no way influenced by the parturition and persisted throughout the entire time of a seventh pregnancy. The author calls attention to the fact that in this last pregnancy the parturition was followed by a marked improvement in the eruption and general condition, which had not been the case at the time of the first attack. In both cases the child was perfectly healthy and the patient recovered completely, which is unusual in this affection. The author questions whether uterine depletion should not be recommended for the purpose of preventing the evolution of this grave dermatosis.

A case of gangrenous impetigo contagiosa, with tuberculosis of the lungs, is reported by Carpenter. ⁵¹_{Apr., '95}

Drouet ³⁵_{Apr. 18, '95} publishes an article intended to throw some light upon the question of the contagiousness of impetigo, in which he enumerates the results of investigations concerning the simultaneous appearance of impetigo in several children of one family. In a series of fifty cases he found forty-two in which successive contagion was probable. ¹¹³⁹_{Feb. 28, '95} Twenty-five of the cases (60.9 per cent.) developed within two months of the suspected contact. Briefly speaking, contagion is noted in 29.3 per cent. of the total number of isolated cases, and in 94 per cent. of multiple cases in one family.

Several new cases in favor of the contagiousness of impetigo are published by Courgey, ⁴³³_{Mar. 16, '95} who concludes that this disease may be the cause of several frequently fatal complications, among which are erysipelas and pneumonia. Rigorous antisepsis is insisted upon by the author.

[The infectiousness or, rather, the inoculability of impetigo is no longer doubted by dermatologists. Only the real nature of the pathogenic agent is still under discussion.—L. B.]

Unna ⁵⁵_{June 22, '95} considers the following mode of treatment as most rapid and most efficacious. The crusts are first softened to allow

of their detachment. Those which persist are mechanically removed. Hæmorrhages sometimes result, but these are superficial and are easily controlled by antiseptic compression. The crusts once removed, the formation of new elements is to be prevented. The eruptive foci are rubbed with a 1 in 1000 solution of corrosive sublimate. This procedure, carefully carried out during three or four days, is sufficient to absolutely prevent the formation of new pustules. An ointment or plaster of oxide of zinc will bring about the termination of the disease after a short time.

Keloid.—A case of keloid from an unusual cause is reported by C. F. Hersman, of St. Louis. ⁴⁵¹_{May, '96} A girl, 14 years of age, consulted the author in order to obtain relief from a burning and itching of the skin over an area which had been burned by lightning some months previously. The limits of the burn could be readily seen by the pigmentation of the skin, and included the posterior aspect of the neck and upper part of the back and the lower part of the back and a portion of the nates. An inspection of the surfaces showed the burn to have been superficial, involving only the upper tegumentary layers, there being no scarring. A few months later a number of keloids, elevated above the skin and of a purplish-red color, appeared on the burned surface. Below, above, and to the right of the internatal fold there was an irregular mass with projecting, claw-like processes, and to the left the skin was rough, indurated, and red. These new growths were not developed on scar-tissue, nor were they so-called idiopathic keloids. The girl had also been struck four years previously, the effect being limited to a transitory paralysis of one of her hands. J. F. Binnie, of Kansas City, Mo., ⁷⁸⁶_{Sept., '94} says that negroes are especially liable to keloid, much more so than Europeans.

Keratodermia.—Bassaget ⁹⁹⁶_{Mar., '96} records a case of congenital and hereditary symmetrical keratodermia of the extremities. The affection first showed itself in the father of the patient; an aunt was also affected. Three brothers, who died at an early age, also had the disease. The patient is a man in good health, not presenting any special nervous symptoms. He has been the father of nine children, among whom one, a girl, who died young, was affected with keratodermia.

Keratosis.—The most precise ideas as to the nature of keratosis pilare of the face are those given in the recent works of Brocq. ³⁵_{May 18, '95} The affection is less frequently studied in the face than in the extremities. Upon the extremities the skin has the appearance of "goose-flesh," and presents small asperities, bosselated and isolated, of a grayish-pink or even black color, hard to the touch, and sometimes situated upon a base which is of a redder hue. Upon the

face there are pilar projections, much smaller and confluent, centred by a hair or its *débris*. They are white in the beginning, red later on, and at certain points varicose. The "peach-flower" variety is sometimes sufficiently ugly to warrant therapeutic intervention. When located upon the eyebrows and beard alopecia occurs,—one of the results of this affection, which usually affects the chin, ears, sides of the cheeks, eyebrows, and forehead. In the eyebrows the keratosis is ordinarily located upon the two ends, the central portion remaining intact, except in the case of frontal keratosis. Upon the cheeks it takes the form of bands. Brocq has, according to the locality, established four types of the latter,—præauricular, submolar, genio-circular, and genial. The treatment consists of an internal medication—arsenic and codliver-oil—and of a local treatment which, in mild cases, consists of ablutions with pumice-stone or salicylic soap, followed by inunctions of glycerole of starch. In severe cases the same frictions, with additional use of black soap, salicylate, pyrogallol, sulphur, or naphtha soap, and the application of codliver-oil, resorcin, or creasote plaster, etc. For facial keratosis Brocq has formulated the treatment in a prescription published by his pupil, Ganja: 1. Twice a week, scrubbing with black soap. 2. Before retiring, daily application upon the affected regions of ointment composed of

R Resorcin,	0.20 gramme (3 grains).
Salicylic acid,	
Naphthol,	ââ 0.30 gramme (4½ grains).
Precipitated sulphur,	1.00 gramme (15 grains).
Lanolin,	6.00 grammes (1½ drachms).
Vaselin,	12.00 grammes (3¼ drachms).

If the disease remain obstinate a plaster of black soap—spread in a thin layer upon a piece of flannel of appropriate size, the soap being dissolved in alcohol—should be applied. The plaster is to be kept in place all night and to be repeated the following days, if the necessity arise, until a local inflammation is produced. The treatment is then completed by applications of salicylic- and tartaric-acid ointment 1 part to 20. Return should be made to the applications of black soap as soon as cutaneous irritation has disappeared. For vascular telangiectasia Brocq recommends crossed linear scarifications. The treatment is a long one, but no cutaneous cicatria remains.

[The ideal treatment consists in destroying the circumpilar projections with the electrolytic needle. I have done this on the arms and faces of women who insisted on the treatment, and with really remarkable results.—L. B.]

Payne ^{967 112} _{Aug., '96; Nov.} reports a case of arsenical keratosis. It was learned that the patient had suffered many years from psoriasis,

for which arsenic had been prescribed. For ten years 3 minims (0.20 gramme) of liquor sodii arseniatis and 3 minims (0.20 gramme) of liquor arsenicalis had been taken three times a day. Upon the suspension of the arsenic and the use of salicylic acid in collodion and in ointment the palms and soles began to improve.

Leprosy.—Bailey^{2000 126}_{95; Oct. 15} states that the diagnosis is frequently very difficult at the beginning of the affection, also in the active period in abnormal forms, and it is often necessary to surely detect the presence of the lepra bacillus to establish a differential diagnosis. This organism may be detected in practically all the lesions of the disease, however, and may readily be found in the pus of leprosy ulcers; in that of bulbar eruptions; in the pus of a permanent blister, according to Kalindero's method; in the blood of local leprosy lesions and in that of the general circulation; in fragments of skin or of subcutaneous nerves.

Lie⁴⁵_{B. 29, H. 3, '95} states that the bacilli of leprosy are mostly situated in the cells. Certain authors also believe that they may exist in the lymphatic spaces (Kuhne, Unna, and others). Lie considers that even in these spaces the bacilli are still in the cells. The bacilli may also penetrate into the nerve-tubes, in which case the myelin and cylinder-axis disappear. In general, the bacilli develop at the same time in the fixed cells of the connective tissue and the migratory cells. The proliferation of the cells is remarkably slow, notwithstanding the great number of bacilli, and is not induced in their immediate vicinity; in the periphery of the bacillar foci the tissue is healthy. In the cells the bacilli multiply more and more and there finally form small, brownish, globular masses, in which the bacilli are very numerous and close to one another. At this stage the softening of the leprosy nodules begins, the degenerative evolution of which thus differs decidedly from the caseous degeneration of tubercle.

An opinion which has received considerable support, to the effect that leprosy was steadily diminishing in Iceland apart from any repressive measures, has been controverted by the researches of Ehlers, of Copenhagen,³⁶_{Aug., '95} who has recently made a journey through the island for the express purpose of ascertaining the prevalence of the complaint. The last statistics, taken in 1889, state that there are 47 lepers, while he found 141, and there are pretty certainly more.

Experiments upon the toxicity of the urine of tuberculous lepers have been made by Chatinière.^{287 126}_{No. 3, '95; July 15} The author used for these experiments the urine of two patients suffering from the above disease. The results are contrary to those published by Fisichella. The author concludes that in reality the urine of

lepers is much less toxic than normal urine; it was four times less so in his experiments.

Ashmead⁶¹_{Mar. 16, '95} reports a case in which the prick of the fin of a living fish in the West Indies was followed by leprosy in a Caucasian subject. At the time of the report the patient presented all the clinical features of leprosy; and sections made of an excised tubercle from the third finger of the left hand showed an abundance of the bacillus lepræ and leprosy-cells. There was no history of leprosy in any preceding generation, and his children and grandchild are healthy. This author¹_{Sept. 21, '95} states that Evaristo García, one of the most distinguished of the Colombian leprologists, is of the opinion that the process of resorption of the phalanges in the nervous leprosy of tropical South America is perfectly comparable to the process of destruction of the bones in the tabetic. He showed Charcot (1876) the anatomo-pathological specimens of this disease. These specimens were presented to the Anatomical Society of Paris and are now in the Dupuytren Museum. Ashmead suggests that this San Antonio disease may have a direct relation with the autochthonous development of leprosy in northern South America, and is probably a link in the chain of development of leprosy from a prebacillary stage, to which may be related the epidemic locomotor ataxy of the Indians of the British North American possessions, and the great prevalence of syringomyelia among the twenty-five thousand so-called lepers of South American Colombia, to the perfect disease characterized by Hansen's bacillus.

R. H. L. Bibb, of Saltillo, Mexico,⁵_{Nov., '94} considers chaulmoogra-oil as a drug of unquestionable value in the treatment of leprosy. J. Goldschmidt¹⁰⁸_{Jan. 15, '95} has successfully used euprophen, giving during a long time, every day or every other day, a subcutaneous injection of the following solution:—

R Euprophen, 0.50 gramme (7½ grains).
Oil of sweet almonds, 10.00 grammes (2½ drachms).
To be filtered and sterilized during twenty-four hours.

Leucoderma.—R. Atmaram, of Hingoli, India,²³⁹_{Nov. 1, '94} to show the heredity of this disease, cites the cases of a father and his three children who were affected with leucoderma. The mother of these children is alive, but has not manifested the slightest evidence of leucoderma.

Lichen Pilaris.—Allan Jamieson, of Edinburgh,³⁶_{Oct., '94} exhibited a case in a healthy boy of 6 years. The cause of this rare condition has not, so far, been discovered. It is an affection of the hair system, and is met with chiefly, but not exclusively, in childhood. The symmetry of its distribution would rather point to a

trophic disturbance than to a parasitic origin. The treatment consists in washing with the resorcin-salicylic soap, but cure has been obtained in other instances by the application of Vlemingx's solution.

Lichen Planus.—Leredde²⁸⁷_{No. 7, '95} draws the conclusion from examination of a case of lichen planus, observed in a woman aged 48 years, that the blood should be examined in patients suffering from this affection. The bullæ on the patient contained no eosinophile cells, but the blood did. Leredde thinks that there are probably chemical changes in the blood; he looks upon lichen planus as an affection of the entire skin and of the mucous membranes. Scratching and cutaneous traumatism act only as determinants of the apparent eruptive elements.

A. R. Robinson, of New York, ²⁴⁵_{Mar., '95} showed before the New York Dermatological Society a case of acute generalized lichen planus. The case was interesting on account of the distribution of the lesions, covering the entire body and both upper and lower extremities, and the peculiar appearance of some of them. On the arm many of them were arranged in the form of circles. The majority of the lesions were small,—large pin-head in size,—with shining, non-umbilicated, flattened surface. Although thousands of lesions existed, no lesion could be seen bearing any resemblance to the lesions of pityriasis pilaris of Devergie.

Wickham, of Paris, ²⁸⁷_{No. 6, '95} describes certain grayish striæ and puncta to be found in lichen planus which he believes to be of use in making the diagnosis of this affection. While not asserting that these are to be found in every case, no exception has yet been met with, and the writer believes these to be pathognomonic of lichen planus.

Lichen Ruber Acuminatus.—Kaposi²²_{Aug. 28, '95} showed a case, occurring in a woman, aged 56 years, showing mental symptoms, to demonstrate what he had expressed through his clinic and the press during the last year, that lichen ruber was identical with the pityriasis rubra pilaris of the French. It was specially to be noted in this case that the throat and neck were chiefly affected, while over the breast the hand could perceive the sharp points. On the other parts of the body the morbid process was receding, as she has been using arsenic for some time past. The disease can be traced along the extensors of the extremities.

On the parts which appear as diffuse erythema are still to be seen the red nodules closely arranged, which formerly stood out as round points. Around the ankles and popliteal regions the isolated efflorescence still bears testimony to the acute character of the disease, while on the neck the hard, infiltrated surface stands

out in strong contrast. The patient is weak and greatly emaciated. The disease is so universal that an isolated nodule is scarcely to be observed.

Lichen Scrofulosorum.—Feulard, of Paris, ^{July 14, '95}_{July 14, '95} showed to the French Society of Dermatology a child who had recovered from lichen scrofulosorum, who had been shown at a previous session. He had been treated by codliver-oil inunctions. For awhile this treatment had been replaced by vaselin and zinc-oxide ointment, and the progress of the recovery had ceased to advance. Besnier, of Paris, agrees with the author that codliver-oil certainly possessed decided local action.

Lupus Erythematosus Disseminatus.—A case is related by Fordyce ⁵⁹_{Oct. 12, '95} in which lesions upon the hands and arms disappeared during pregnancy, leaving atrophic spots surrounded by a pigmented zone. In a second case the eruption likewise disappeared, but came back in an equally severe form after the confinement.

McCall Anderson, of Glasgow, ²¹³_{Dec., '94} reports a case of widespread erythematous lupus, illustrating the value of iodide of starch. The treatment, begun on June 4th, consisted in regulation of the bowels with ext. cascariæ liq. and in the administration of iodide of starch. No local applications were made. The initial dose of the iodide was 1 drachm (4 grammes) thrice daily, but it was gradually increased to 4 drachms (16 grammes) thrice daily. On the 20th of July there was no visible affection of the face, and the margin of the former patches could with difficulty be felt. On the breast their situation was shown only by a slight pigmentation. On the hands and feet they still preserved a pale-pinkish color, with a slightly darker margin, which, however, was not elevated and from which induration had disappeared. Across some of these elliptical patches a straight cicatrix was found to run, indicating the line of the former "cut."

Lupus Vulgaris.—Jonathan Hutchinson, of London, ¹³¹_{Sept., '95} does not accept the inoculation of the tubercle bacillus from without as an ordinary cause of lupus. It seems to him far more probable that the parasite exists during long periods in a state of latency, from which any local injury may rouse it into activity. In the case presented he thought it was the occurrence of a boil which, reducing the vitality of the skin, made it an easy prey to the parasite.

Paul Neisser ⁴_{Jan. 21, '95} publishes an article on lupus vulgaris of the scalp. He has discovered but three such cases. The first was that of Hallopeau; the second was that of Van Haren Noman; the third, reported by Wolters, relates to a medical student, who,

suffering from non-cicatrized wounds of the scalp caused in a duel, frequently examined sputa for tuberculous bacilli. During this occupation he often scratched the wounds, which itched. Two months later lupus appeared in one of the cicatrices; after excision giant-cells and tuberculous bacilli were found in it.

E. B. Purdon ⁶⁹⁷_{v.7,p.60,'95} reports a case of tuberculous lymphangitis associated with lupus vulgaris.

Darier, of Paris, ²⁸⁷_{No.7,'95} reports a case of lupus of the tongue with histological examination. There were two lupous patches on the tongue. Histological examination demonstrated the lupoid nature of this rather uncommon lesion, which was still further curious by the presence of numerous connective-tissue cells in a state of hyaline degeneration,—what has been until now most exceptional in lupus.

O. Liebreich, of Berlin, ²_{Mar.2,'95} read a paper before the Berlin Medical Society on the treatment of lupus by cantharidin and on tuberculosis. The author argues that in the case of small animals the smallest doses of tubercle bacilli suffice to create a general disease, which in every case kills the animal. But the resisting power of human beings is much greater. An inoculation of tubercle bacilli would, in a healthy individual, produce not general tuberculosis, but only localized nodules. The disease could only supervene where there was what is called a predisposition,—that is, diminished vital energy of the cells of the organism. The healthy human cell resists the action of parasites, and only where it is weakened can it be attacked by nosoparasites. In treating nosoparasitary diseases it is important to strengthen the vitality of the cells, and Liebreich has found cantharidinate of soda or of potash most valuable for this purpose.

Grabower ²²_{Mar.27,'95} first reported ten cases of tuberculosis of the larynx and lungs treated by Liebreich's cantharidin method. In three cases the treatment had to be abandoned on account of the effect on the kidneys. In one case cylinders and epithelium of tubules appeared in the urine, although none were present before the commencement of the treatment, and continued until the death of the patient, two years and four months later. In the second case albumin and strangury appeared two days after the fourth injection, the patient dying two days later. In the third case the albuminuria was transient, as the injections were stopped in time. The remainder of the cases had injection from fifteen to twenty-three times, but no effect was afterward to be observed on the local affection.

M. E. Wassiliew ⁵³⁰_{v.48,No.6; May 1,'95} reports a case in which a facial erysipelas extended to some patches of lupus, the latter com-

pletely disappearing, leaving no trace but some pigmented and misshapen cicatrices.

Scharff, of Stettin, ³_{Sept. 25, '95} observed, at Unna's Dermatological Clinic at Hamburg, in cases of lupus of the face, a treatment which, later on, he employed with good results, and which prevents recurrences of the affection as well as the production of ugly cicatrices. The treatment consists in inserting into the diseased parts small needles of wood having remained for several days in the following solution:—

R Corrosive sublimate,	. . . . .	1 gramme (15 grains).
Salicylic acid,	. . . . .	10 grammes ($2\frac{1}{2}$ drachms).
Sulphuric ether,	. . . . .	25 grammes ($6\frac{1}{2}$ drachms).
Olive-oil,	. . . . .	64 grammes (2 ounces).

F. S. A.: For external use.

The operation is painful, but the pain is not insupportable; it can be avoided by having recourse to local anæsthesia.

Lang, of Vienna, ³¹_{June 1, '95} showed before the medical society of that city a patient whom he had cured of extensive lupoid infiltrations of the face, arm, and thigh by extirpation, followed by grafting according to Thiersch's method. In the author's opinion, this method is of great value and should be preferred to all others.

Elsenberg ⁹⁹⁶_{Apr., '95} ⁸⁰_{June 15} bathes the surface of the lupoid ulceration with alcohol and then with ether or a concentrated aqueous solution of carbonate of potassium, and then applies to the diseased surface an ointment made up of equal parts of lanolin, vaselin, starch, and parachlorphenol. Sometimes he adds a little chlorate of potassium. This ointment he allows to remain on for ten or twelve hours, removing it with dry cotton, and then applying a salicylated or iodoform ointment. Two days later a second application of the parachlorphenol ointment may be made, and other applications at the same interval. After the series is ended a plaster is applied for ten days, generally until the end of the reaction is reached.

Melanoma.—Lassar, of Berlin, ¹¹⁵⁷_{B.I.H. 6} ⁵_{Mar., '95} records a case of melanoma in which the internal administration of arsenic was followed by the disappearance of the tumor. The patient, a woman 35 years of age, had beneath the right breast a pigmented mole, which, being rubbed by the corset-stay, became the seat of a small tumor. Simultaneously the nævus began to grow peripherally. This small nodule was cauterized, very probably with the galvano-cautery, but, instead of it healing, renewed proliferation occurred. Because of this untoward result the patient absolutely refused to permit any further operative interference, and recourse was had to the internal administration of arsenic. Within the

first three weeks involution began; but, the patient neglecting treatment, the tumor began to grow again. Upon the resumption of the arsenic retrogression again occurred. Under this treatment, continued for some time, the tumor completely disappeared; the pigment-mole remained, however. Unfortunately, owing to the refusal of the patient to permit the excision of a portion for microscopical examination, the diagnosis must remain in doubt.

Molluscum Contagiosum.—Jackson Clarke⁵⁰_{B.17, Nos. 7, 8; July 15, '96}¹²⁶ states that in a case of molluscum contagiosum he collected the contents of a certain number of the papules, the skin having been rendered aseptic. These were placed on a sterilized glass slip, a drop of sterilized water was poured upon them, and the slip, having been placed on damp filter-paper, was put into a Petri box in the incubator at from 15° to 20° C. (59° to 68° F.) Notwithstanding all these precautions a large number of bacteria was found in the drop of water at the end of four days. Exceedingly motile, flagellated corpuscles of the dimension of a red blood corpuscle were also observed.

K. Tontou²¹⁶⁹_{'94} states that recent observations lead him to the same conclusions that he arrived at before,—namely, that the parasite of this disease is a single-celled animal organism, probably a coccidium belonging to the sporozoa.

[The pathogenic agent of molluscum contagiosum is still unknown; nevertheless, the affection is incontestably inoculable.—L. B.]

Henry W. Stelwagon²⁴⁵_{Feb., '96} discusses the subject of the contagiousness of molluscum contagiosum, and concludes, after a careful review of medical literature, that the adduced negative evidence—such as the occurrence of the disease in isolated cases, and the failure in most instances of the attempt to produce the disease by inoculation—has no weight whatever.

P. A. Morrow, of New York,²⁴⁵_{Feb., '96} states that in one case of molluscum contagiosum coming under his observation he removed over three hundred of these growths, situated on the trunk, with the dermal curette, and the result proved very satisfactory. A few of the tumors were situated on the penis and scrotum.

Mycosis Fungoides.—Louis Wickham, of Paris,¹⁴_{Apr. 24, '96} showed before the Société Française de Dermatologie a girl, aged 18 years, whose right cheek for five months presented an ulcer having the aspect of a chancre; no lymphatic glands could be felt, however, and histological examination proved that it was mycosis fungoides, the rapid evolution of which had at once given rise to a tumor.

Leredde²⁸⁷_{No. 3, '96}¹¹²_{July, '96} reports a case of mycosis fungoides in which, after a short erythrodermic phase, the lesions appeared upon the

lower extremities, under the form of small confluent tumors which disappeared within a year. For the preceding five or six months the patient complained much of urticaria, the lesions appearing during the night and diminishing in the morning. This eruption was very rebellious to treatment. More recently the urticarial lesions showed a tendency to persist, some of them being large and hard. These the author regarded as new mycotic lesions. Although the skin appeared to the naked eye but little changed, microscopical examination showed considerable alterations, the most characteristic being the presence of numerous "mast-cells," which the author believes play an important rôle in the disease. Leredde believes that in the skin, which appears normal, alterations may be discovered with the microscope some time before they are evident clinically.

Leslie Roberts¹⁹ July 13, '96 reports a case of mycosis fungoides in a woman, ending fatally.

Nævus Lipomatodes.—George Thomas Jackson, of New York,²⁴⁵ Feb., '96 reports a case of nævus lipomatodes in a child. The distribution of the nævus, reaching from the upper part of the concha to the front of the neck, was remarkable not only for its extent, but also for the fact that on the scalp were two distinct patches of baldness. These were not complete, but had in them some straggling hairs. They were slightly elevated and felt soft. They were divided by a narrow line of hair.

Nævus Lupus.—Jonathan Hutchinson, of London,⁶⁹⁷ Apr., '96 showed before the Dermatological Society of London a case of infectious angioma, or nævus lupus, of the hand. The original condition in early childhood was that of two nævoid patches in the skin of the back of the hand, between the thumb and forefinger. They were about the size of two sixpences, and were placed near together, with a third, about the size of a pea, close to them. Although certainly nævoid in part, they were not purely so, for their surface was rough and had a dry, adherent scale-crust. They had originated in early childhood and had not been present at birth. The disease was clearly aggressive and "infective," and two of the patches were, no doubt, "satellites" to the other. At the presentation the girl's hand showed a condition of acute inflammation around the patches which had occurred in connection with the recent cold weather and a slight bruise which had been received. The patches had also increased considerably in size. The girl had no skin disease elsewhere.

[I cannot accept these new denominations of Hutchinson. I do not know from what affection his patient suffers, but I consider that it can be but one of two things: either she has true lupus—

that is, a tuberculous inoculation of the skin—or she has not. If the first, it must be lupus developed on nævus; if the second, the term “lupus” (which has but a single meaning) should not be combined with the term “nævus”; nævus lupus means nothing and can mean nothing.—L. B.]

Noma.—[During the past year I have had twenty-four cases of noma under my care, in patients from 6 months to 8 years of age, all the children of poverty-stricken people living in the highly-malarial city of Peking. Such cases usually prove fatal. The left cheek was the favorite site of the gangrenous spots, but in several cases the disease first appeared in the gums in the median line, destroying them and the alveolar process rapidly. One case commenced in the lower gums and soon destroyed the entire right side of the lower maxilla, which I removed. The wound then healed up, but the child grew progressively weaker in spite of tonics, stimulants, etc., and died of exhaustion about three weeks after the operation. All the cases presented markedly enlarged spleens and profound anæmia. Various preparations of arsenic, iron, iodine, and cinchona were tried, with apparent improvement for a few days, but all the patients ultimately died. Post-mortem examinations are impossible here; so that nothing can be learned of the pathological appearances of the organs of the body. My belief is that the disease is due to malarial infection and that a change of residence and nutritious diet might lead to improvement.—Report of R. Coltman, corresponding editor, Peking, China.]

Œdema (Angioneurotic).—Ricochon³_{Aug. 17, '95} reported the clinical history of a family whose members had during three generations suffered from acute recurrent œdema of the skin. The group of symptoms may be divided into two phases: the first, in which œdema appears by itself by successive attacks for two or three days; the second, which coincides with the disappearance of the œdema and consists in colic, tympanites, sometimes vomiting, almost complete suppression of urine, at times albuminuria, obtundition of the senses, sleepiness, fever, loaded tongue, great thirst, etc. The author thinks that these are really uræmic symptoms due to functional modifications of the kidney related to a form of paroxysmal neurosis of the renal plexus. James W. Russell³²_{Sept., '95} reports a case of angioneurotic œdema with urticaria.

Œdema (Vasomotor).—M. B. Tchickoff³_{Sept. 4, '95} describes, under the name of “vasomotor œdema without albuminuria,” an affection which he has observed in seven male patients aged from 25 to 60 years, and which consisted essentially in the production of considerable œdema without any lesion of the heart, lungs, liver, or spleen. There were no renal symptoms, especially albuminuria

or uræmia, while hæmatoscopical symptoms of anæmia or chloranæmia were wanting. In some of the patients the affection assumed a chronic course; œdema developed slowly during a period of three or four months, and presented an aspect analogous to that of the œdema of chronic nephritis. In other cases, especially in plethoric individuals, the œdema assumed an acute course. In some cases the appearance of the œdema coincided with the almost complete fall of the hairs of the beard, moustache, and genital organs; the hair also would fall, would become thinner, soft, and would change color. Examination of the blood revealed a reduction of hæmoglobin in all the cases. Of seven patients observed by Tschickoff five suffered from syphilis. He thinks that this form of œdema without albuminuria depends upon an affection of the vasomotor centres, usually due to syphilis, but which may also be due to other infectious diseases whose toxins are capable of causing alterations analogous to those which, for instance, cause diphtheritic paralysis.

Pemphigus.—Kaposi, of Vienna, ⁶⁹⁷_{Nov., '95} published a paper giving the present position of our doctrines regarding pemphigus. His conclusions were summed up as follows: "1. Pemphigus is a definite, clinical conception. It is not confined either to special morphological characters (polymorphism) or to special histological characters (more or less intense participation of the epidermal layers and papillary bodies), but is characterized by the association of these and by its clinical course. 2. Our very limited knowledge of the causes of the disease and our conspicuous ignorance of its etiology constitute no argument against the maintenance of the clinical conception of pemphigus, as our general conception of other skin diseases is of necessity independent of our ignorance of their etiology. 3. In one and the same patient, over a period of months and years, all possible forms, modifications, and varieties in the course of pemphigus can be observed. Hence it follows: 4. That the various different types of pemphigus represent one and the same disease. 5. That the clinical and histological characters attributed to the chronic, relapsing, benign or malignant, and lethally terminating forms of 'dermatitis herpetiformis' correspond in every respect with those formerly observed and described as pemphigus, and are, in fact, identical with pemphigus. 6. There is, therefore, not the slightest ground for giving up the old-established, classical name and morbid conception in favor of the modern 'dermatitis herpetiformis.' 7. The acute and benignly terminating disease-processes, referred by some authors to forms of so-called dermatitis herpetiformis of Dühring, correspond with diseases formerly well known and described as

urticaria papulo-bullosa, annularis, gyrata, lichen urticatus, but especially with Hebra's erythema multiforme, particularly in its vesicular and bullous forms. 8. The denomination of dermatitis herpetiformis applied to these acutely-running, papulo-vesiculo-bullous forms of erythema, therefore, finds no justification. 9. I do not know whether there are diseases besides pemphigus and the other well-known diseases mentioned in which polymorphous erythema and bullæ exist, and which should be designated 'dermatitis herpetiformis.' I myself have never met with forms which could not be included under the long-known and accepted title of 'pemphigus.' I have, therefore, never been compelled to make the diagnosis of dermatitis herpetiformis or to apply the name to any case."

Kaposi states that his observations were based upon a study of 320 hospital cases, observed from 1860 up to the present, of whom 209 were men and 111 women, and of at least one-third of that number of additional cases in private practice. His mortality had been 18 to 20 per cent. He maintains that varieties in anatomical form depend upon intensity of the pathological process, while the favorable prognosis usually attributed to so-called dermatitis herpetiformis is erroneous and illusory, referring to fatal cases recently reported.

[It is needless to remark that such conclusions cannot be accepted, the more so as they are rejected at the present day by most dermatologists. Dermatitis herpetiformis is a distinct morbid type, now recognized by almost every physician.—L. B.]

Pityriasis Maculata.—An eruption resembling pityriasis maculata et circinata, probably induced by alcohol, was seen by Henry H. Morton, of Brooklyn. ^{June 8, '95} The patient, aged 28 years, and a domestic by occupation, drank heavily for two weeks prior to the appearance of the eruption, which occurred first as one spot on the face and then showed itself over the entire body in twenty-four hours. The patient states that it was bright red in color when it first appeared, but has become darker since then. The patient admits having had coitus three months ago, but not since then, and denies having had any sores on the vulva or other signs of syphilis; examination shows no evidence of a chancre or mucous patches. Lymphatic glands are not enlarged, with the exception of some in the groin.

The chief interest in pityriasis maculata, however, lies in the extreme similarity of its appearance to other diseases of the skin, notably the macular or erythematous syphilide, and, since so many unpleasant situations may arise from mistaking an innocent and non-contagious skin eruption for a communicable and generally

considered disreputable disease, it is always well to bear this affection in mind before making a positive diagnosis of syphilis in every questionable case, although the lighter tint, branny scaling, and absence of mucous patches and glandular enlargements will generally serve to exclude the latter disease.

Pityriasis Rubra.—Walter Scatchard²_{Mar. 2, '95} reports a case in which a woman, 72 years of age, showing the lesions of pityriasis rubra in a pronounced form, was much improved in twelve days from the administration of thyroid tabloids. In a little over two months the skin presented a normal appearance, except that there was a tendency to a fine, branny desquamation in some parts. Two weeks later this symptom had disappeared. Some systemic depression was caused while patient was taking the tabloids, but this was overcome upon the discontinuance of the drug and the administration of strychnine and wine.

Pityriasis Versicolor.—Fournier and Sabouraud, of Paris.⁵_{Mar., '95} reported to the Société Française à Dermatologie et de Syphiligraphie a case of infantile syphiloid due to pityriasis versicolor.

Leistikow²⁸_{Feb. 1, '96}; ³⁶_{Aug.} points out that, harmless though this parasitic affection may be, yet it is often difficult to get permanently rid of. He had good results from the employment of precipitated sulphur, the efficacy of which he attributes to the formation of sulphur acids. He found, on further investigation, that an ointment compounded as follows, used for from eight to fourteen days, completely cured the disease:—

R Bisulphurous solution of calcium, . . . 60 grammes (2 ounces).
Lanolin,
Vaselin, 20 grammes (5 drachms).—M.

To prevent recurrence he advises that the patient should wash once a week with Eichhoff's quinine soap, continuing this for a month or two.

Pruritus.—Valerius Idelson, of Berne,¹⁰⁹_{Feb., '96} reports that a few years ago Blaschko, of Berlin, published a paper⁴_{No. 22, '91} in which he drew attention to the fact that antipyrin, given internally, was an excellent remedy for relieving cutaneous itching in cases of prurigo, lichen urticans, urticaria, eczema, etc. Following this recommendation, Feliks Arnstein, of Kutno,⁵²⁰_{No. 48, '94} has recently tried the drug in two exceedingly severe cases,—one of which referred to a woman of 28 years with prurigo and the other to a woman of 66 years with senile pruritus. In both the remedy was given in powder, 1 gramme (15 grains) daily, at bed-time; the pruritus rapidly subsided, to disappear altogether in a couple of weeks or thereabout.

Berger, of Paris,¹⁰⁹_{Sept., '96} recommends, as a very successful measure

in pruritus ani, cotton compresses wet in a solution of chloride of lime and passed into the anus, to be retained a few minutes, if the patient does not complain too much of the burning. The external parts are bathed with the same solution and allowed to dry. This method rapidly relieves the itching; it also cures the surrounding eczematous eruptions. The concentration of the solution must be graduated to suit the tolerance of the patient.

Psoriasis.—L. D. Bulkley, of New York, ⁶⁷³_{Apr., '95} contributed a paper based on three hundred and sixty-six cases of psoriasis seen in private practice. The disease occurs a little oftener in males than in females, at all ages, chiefly from 15 to 30 years of age. It is essentially chronic; in the cases mentioned it had existed five to ten years before the patients consulted him. In one instance it had existed thirty years. The point emphasized is that psoriasis is not a local disease, but depends upon a general condition which produces the eruption again and again, and is closely associated with gout and faulty metabolism. It was benefited by alkaline remedies, counteracting acidity of the blood and urine. Local treatment was only of secondary importance. Psoriasis could and should be cured, just as gout, chronic bronchitis, etc., could be cured.

Stephen Mackenzie, of London, ⁶¹⁷_{Jan., '95} showed before the Dermatological Society of London a case of psoriasis of the nails associated with end-joint rheumatism.

C. M. Rambo, of Zanesville, Ohio, ¹_{Oct. 13, '94} reports a case of psoriasis at the age of 2 years and 5 months. Samuel Sherwell, of Brooklyn, ¹⁵⁷_{Feb., '95} presented to the Brooklyn Dermatological and Genito-Urinary Society a child 8 years old with a psoriasis of the body. Morton considered psoriasis a rare disease in young children; he did not remember having seen it in children under 12 years of age.

Haslund ¹⁴⁷_{July 24, '95} placed thirteen patients—seven men and six women—under heavy doses of iodide of potassium. Four cases were unquestionably cured through the action of the drug; in one case, owing to disturbance of digestion, the potassium iodide could not be continued, although improvement was noted. Complete recovery in the remaining cases cannot be claimed, while the use of chrysarobin and anthrarobin led to a rapid cure. The amount of potassium iodide used varied from 344 to 850 grammes (11 to 27 ounces) in the average treatment of seven weeks.

Chas. Forbes, ²²_{July 24, '95} Albert Wilson, ²_{Feb. 16, '95} and H. R. Preece ²_{Mar. 30, '95} report cases successfully treated by thyroid extract. At the French Congress of Internal Medicine, held at Bordeaux, G. Thibierge, of Paris, ³_{Aug. 17; Aug. 31, '95} stated that he had tried the thyroid

treatment in eleven cases of psoriasis. As a result, the author concludes that the thyroid method is not a specific for psoriasis, nor should it be employed as a matter of routine.

Hutchinson, of London, ²²_{July 3, '96} states that, on the whole, the use of thyroid tabloids in psoriasis has been disappointing; nevertheless, great improvement has been noted in certain cases. He knows, however, of nothing in the thyroid treatment which could be held to compete with the benefits derivable from the administration of arsenic in these cases.

H. Radcliffe-Crocker, of London, ⁶_{June 8, '96} contends that, in some cases, arsenic is not only useless, but injurious; that it fails entirely as a prophylactic, and that usually local applications are preferable to its use. He considers the thyroid treatment has a limited sphere of usefulness, but that it does not give more permanent results than other methods. Thyroid extract is unsuitable for elderly patients with weak hearts on account of its depressing effects.

The author calls attention to the use of salicin, salicylates, and their allies and derivatives, which had in his hands yielded striking and conclusive results.

J. A. Cantrell, of Philadelphia, ⁸⁰_{June 15, '96} treats psoriasis with 5-minim (0.32 gramme) doses of oil of copaiba, with excellent results.

Purpura Hæmorrhagica.—Hayem, of Paris, ¹¹⁵³_{June 22, '96} states that the results of examination of the blood in certain cases have induced him to recognize the existence of a variety of purpura hæmorrhagica in which the blood presents the following characteristics:—

1. Absence of any appreciable anatomical alteration of the red blood-corpuscles, unless, perhaps, decrease or absence of exudation corpuscles.

2. Considerable decrease in the number of hæmatoblasts; those that remain are often of large size.

3. No constant alteration in the white blood-corpuscles; in one case only the number of such elements was increased independently of any phlegmasia.

4. Coagulability of the normal blood; the fibrinous reticulum is either invisible or formed of fibrillæ exaggerated in size.

5. Absence of transudation of the serum, coinciding with feeble contractility of the clot.

Grosz ¹⁵⁸_{v.18, '94} ¹¹²_{Apr. '96} reports 53 cases of purpura which occurred in the Stephanie Children's Hospital among a total of 90,556 cases of disease. He concludes as follows:—

1. In childhood a hæmorrhagic diathesis occurs in which

hæmorrhages appear in the skin, the subcutaneous connective tissue, and various other parts of the organism.

2. The attacks of purpura can be divided into two groups,—those in which involvement of the joints occurs and those in which there is no joint involvement.

3. The name “purpura” comprises cases of purpura simplex, hæmorrhagica, and rheumatica.

The course of the attack is only exceptionally accompanied by fever and is usually without danger to life, though sometimes death occurs through severe anæmia, cerebral hæmorrhages, etc.

Shepherd, of Montreal, ⁵⁹_{Oct. 12, '95} reported to the American Dermatological Association a case of purpuric eruption ending in gangrene and apparently caused by sodium salicylate.

Scleroderma.—Friedheim ³¹_{May 7, '95}; ²_{Aug. 10, '95} relates a case of extensive scleroderma in a female of 21. The diagnosis was made certain by the sclerosis, atrophy, and pigmentation of the skin and by the absence of sensory disturbances. That the disease is a trophoneurosis is supported by the disturbance in secretion and the muscular atrophy (such as facial hemiatrophy) sometimes seen. In the case reported sensation to temperature and touch was unaffected, but there was slight hyperæsthesia to the electric current. As regards treatment, massage properly applied, along with numerous baths and lubrication of the skin, has given the author the best results in these cases. The improvement has fallen short of cure. The palliative action of electrical treatment is at times considerable.

Hallopeau, of Paris, ¹⁵²_{Jan. 18, '95} reports a case of sclerodermie en bande, limited to the area of the internal cutaneous brachial nerve. The disorder began as a spot in the middle of the forearm, and only after several months extended the whole length of the upper extremity. If, as is probable, the affection is a trophoneurosis, the different fibres of the nerve were involved successively. The onset and course were marked by paræsthesia and lancinating pains. In the sclerosed parts there was a diminution of sensibility to touch and pain, which is generally not the case.

Seborrhœa.—W. Van Hoorn ²⁸_{B. 20, H. 10, '95} thinks that the parasite may assume three distinct forms: at times the rods described by Unna, at times small ovoid corpuscles, and finally more voluminous spherical bodies, similar to those described by Bizzozero.

Alfred Eddowes ⁶⁹⁷_{Apr., '95} reported the case of a woman, aged 31 years, who had lost a great deal of hair from seborrhœa, which had affected her scalp for many years. When first seen by the author the scalp was covered by dried secretion of a yellow color, and the epidermis was in a warty condition. The patient had

been under treatment some years ago for conjunctivitis of a chronic nature, which had destroyed her eyelashes, and was then under Dundas Grant's care for disease of the ear (external meatus). In Eddowes's opinion, the seborrhœa of the scalp was closely connected with the condition of the eyes and ears, and he considered the case a most interesting example of a large series of similar cases which he had recently observed.

Tattooing.—E. D. Williams, of High Wycombe, ² June 29, '95 reports a case of tattooing followed by acute rheumatism.

T. C. Minor ¹⁴⁴ Sept., '95 publishes an article on the removal of tattoo-marks as practiced by Variot and Baillot. The principle of the method is to form a dermic destruction of the tattooed part. It is first necessary to paint over the tattoo-marks with a concentrated solution of tannin; afterward, by means of fine needles, a series of prickings are made over the tattooed design. Over the surface thus pricked a stick of nitrate of silver is passed. At the end of a few minutes the black prickings previously made become detached and the superficial layers of derma are then known to contain a tannate of silver. In order to assure success this surface must be powdered with tannin for two or three days. The end is very simple. After an inflammatory action, lasting two or three days, the pricked parts turn black, forming a thin crust, very adherent to the deeper skin, but painless. At the end of from fourteen to eighteen days the scab falls off, and in its place a superficial red mark is seen, which gradually fades away until, at the end of a few months, all signs of coloration disappear. Variot and Baillot also suggest the use of bioxalate of potassium in place of nitrate of silver. Of course, antiseptic precautions are all taken in performing this operation, and the old tattoo-needle is used to remove all tattoo-marks.

M. J. Brault, of Paris, ²⁸⁷ Jan., '95; ⁶⁹⁷ Apr., '95 recommends a method which consists, after insuring asepsis of the region, in making, or rather remaking, by means of classical needles, a tattooing with chloride of zinc. The best strength of solution for use is one of 30 parts of zinc chloride to 40 parts of sterilized water. If proper care be taken, the operation is not followed by any untoward inflammatory reaction.

Trichophyton Tonsurans.—Allan Macfadyen, of London, ² Sept. 22, '94 studied the biology of the ringworm with the view of determining whether the trichophyton produces ferments, and, if so, what their nature is. It has been found that those bacteria which liquefy gelatin do so by means of a soluble ferment or enzyme. This subject has been investigated by Bitter, Fermi, the writer, and others. The present writer's observations had been hitherto con-

fined to the bacteria. It was with a view of extending these investigations to the group of the molds that the trichophyton tonsurans was selected in the first instance. The results, briefly summarized, were as follow :—

1. The ringworm organism produces a proteolytic enzyme, which liquefies gelatin very rapidly.

2. This enzyme is capable of acting even when greatly diluted, and is very stable, as its action can be demonstrated in cultures three months old.

3. This enzyme acts most rapidly and energetically at or near blood-heat. At blood-heat a complete liquefaction of 10-per-cent. gelatin was produced in fifteen to seventeen hours.

4. Exposure to a temperature of 100° C. (212° F.) for two minutes destroys the ferment.

5. The proteolytic enzyme is also produced in simple beef-broth; acidity hinders and alkalinity favors its production.

6. The gelatin containing the active enzyme did not exert any inimical action upon the staphylococcus pyogenes aureus or upon the bacillus pyocyaneus.

7. The formation of a diastasic ferment by the ringworm organism was not demonstrated, but it grew well in solutions of grape-sugar and milk-sugar.

8. A slight growth was obtained on cane-sugar soils and evidence obtained of the presence of a feeble inverting ferment.

9. A milk-curdling ferment is not produced by the trichophyton.

10. The best soil for its growth was Sabouraud's beerwort agar, consisting of beerwort with the addition of 1.5 per cent. of agar.

11. It may be that the proteolytic enzyme aids the organism in softening the tissues and overcoming their resistance to the penetration of the hyphæ.

It would be interesting in this connection to test the action of the enzyme on keratin, and experiments are being at present carried out in this direction.

Tenneson ¹⁴_{Apr. 24, '95} described a case of originated trichophytic folliculitis. The affection was located upon the cheek, and the author proposed to treat it by energetic curetting, there being, in his opinion, no danger of removing anything but the diseased portion by such treatment. Besnier stated that in cases of this kind recourse may be had to applications of iodine. In order to succeed these must be made with a hard brush, and should be very vigorously applied. This mode of treatment should always be tried before resorting to the curette.

A man, aged 37, who was employed by a butcher, suffered from an extensive dermatomycosis of the right side of the neck and face. H. Prip, of Copenhagen, ³⁷³_{No. 31, '94} ⁶⁷³_{June, '95} who examined minutely the hairs, found in each case that the hair itself was free, while the sheath was invaded by spores and mycelium of trichophyton. The spores only measured 3μ to 4μ , but the author, nevertheless, considers this skin disease the result of the invasion of the macroscopical form of trichophyton described by Sabouraud, partly on account of its clinical appearance, which resembled exactly that described under the name of *Sycosis trichophytique à dermatite profonde*, and partly because the mycosis was extrapilar and accompanied by the formation of mycelium, some of the spores also exhibiting double contours. The author has no doubt that the disease was communicated from a calf, the patient often carrying calves on his right shoulder in such a way that their skin exactly touched the part of the body invaded by the disease; the patient also voluntarily stated that he had noticed that several of the calves he had carried suffered from "ringworm." Prip examined the fellow-workers of the patient and found one, a man aged 20, with a developed tinea on the right forearm. Microscopical examination revealed the same details as here described. In the second case, however, the mycelium contained yellowish spores, while in the first it did not.

J. Abbott Cantrell, of Philadelphia, ²⁴⁵_{Aug. 1, '95} states that he has recently seen a case of circinate ringworm in which two separate rings were presented to view, one being within the other.

W. Dubrenilh ²⁵_{Oct., '95} reports a case of palpebral trichophytosis.

Ulcers.—S. Tousey ¹⁹⁸_{v. 2, p. 111, '95} recommends the use of creolin in sloughing ulcers of the leg, using a dressing of several layers kept constantly wet with a 2-per-cent. solution. Creolin forms a whitish emulsion with water, which is not irritating, even to an eczematous skin, and which is powerfully antiseptic and deodorant. The author states that under its use the slough rapidly disappears and the odor is abolished almost from the start. The bandage should be kept wet without removing it, for the dressing becomes very painful the moment it begins to dry; or the bandage may be prevented from drying by covering the wet pad of gauze with a layer of rubber tissue before the usual unbleached-muslin bandage is applied. After a quite thorough arrest of the sloughing the ulcer is to be treated by either soothing or stimulating applications.

Marquant ¹⁰⁷_{Aug. 15, '95} has obtained excellent results from static electricity, especially in varicose ulcers. The method employed, which was originated by Doumer, of Lille, is as follows: The sore is first

washed with antiseptic solution (perchloride of mercury or carbolic acid in feeble proportions) and then covered with a thin layer of absorbent cotton. The patient is placed on an insulating seat and connected with the negative pole of an electro-static machine. The electrode is then approached to the sore, keeping it, of course, sufficiently far away so that no sparks are discharged, though near enough for the production of the electric breeze. This is continued for ten minutes, after which the wound is dressed. The sittings are usually repeated three times a week.

As dressing, a simple application of absorbent cotton-wool is resorted to. As this dressing is only renewed twice a week, the static breeze is practiced once in every three times through the layer of cotton, which, therefore, should be as thin as it is possible to procure.

J. Will Summers, of Hammond, Illinois, ⁵⁹_{Nov. 24, '94} recommends a new and painless method. After cleansing the ulcers with a solution of sodium bicarbonate he applies a solution of methyl-violet, care being taken to bring it in contact with the entire area of the base and margins. After allowing it to dry each stained ulcer is covered by a small bit of absorbent cotton. Mechanical support was furnished by Martin's elastic bandage. This entire procedure is repeated every morning. An excellent solution is that used by M. F. Coomes, of Louisville, Ky., in the treatment of lupus,—*e.g.*, methyl-violet, 5 grains (0.32 gramme); distilled water, 2 ounces (60 grammes). This forms a harmless and entirely painless application.

Urticaria.—Lanz ²²_{Oct. 10, '94} states that he has used ichthyol with remarkable success against urticaria. He gives it in 4-grain (0.25 gramme) doses, concealed in a wafer, twice a day, after the two principal meals.

Augustus Eshner, of Philadelphia, ⁵⁹_{Mar. 9, '95} obtained very satisfactory results from the use of pilocarpine hydrochlorate in urticaria. The drug has a pronounced effect upon the circulatory and secretory activity of the skin.

Brocc, of Paris, ¹⁵_{June, '95} states that, when it is well borne, anti-pyrin can be used; if not, pills containing hydrochlorate of quinine and ergotine, each 0.08 gramme (1¼ grains), and extract of belladonna, 0.002 gramme ($\frac{1}{32}$ grain); from 3 to 6 of these pills daily. The patient to be placed almost exclusively on milk diet, with a little Vichy water, and to be covered with starch-powder and fine-linen rags.

Warts.—G. Variot, of Paris, ¹_{Nov. 17, '94} reports a case of warts of the mucous membrane coincident with warts of the hand. Microscopical examination showed all the characteristics of horny pro-

ductions analogous to those which are met with in verrucous papilloma. The author thinks that the papilloma on the mucous membrane was connected with the warts on the face, and that in this case there had been self-inoculation. This fact, he thought, might be added to others to prove the inoculability of warts not only on the cutaneous surface, but also on the surface of the dermo-papillary mucous membrane.

Kaposi, of Vienna, ⁴⁵¹_{May, '95} recommends the following mixture in the treatment of warts:—

R Sublimed sulphur,	. . . . .	2½ drachms	(10 grammes).
Glycerin,	. . . . .	6½ fluidrachms	(25 grammes).
Pure acetic acid,	. . . . .	1½ fluidrachms	(6 grammes).

This mixture is applied once a day to the regions covered with warts and the growths shrivel up and ultimately disappear.

Xeroderma.—David Walsh, of London, ²²_{May 1, '95} reports a case of xeroderma much improved by thyroid extract in 5-grain (0.32 gramme) doses three times a day. The patient was a man of 30, suffering from congenital xeroderma. There was general dryness of the skin, with, in parts, a slight lichenoid condition and slight enlargement of the follicles.

Xeroderma Pigmentosum.—Tommaso de Amicis ⁵⁰⁷_{Sept., '94}; ⁶⁹⁷_{Feb., '96} reports two cases of xeroderma pigmentosum. Micro-organisms could neither be detected in the tissues nor in the blood, which showed numerous eosinophile cells. The cases presented the following interesting points:—

1. The affection developing in infancy and occurring in the same family.

2. The epiphyseal thickening and the presence of molluscum in the face of the elder child.

3. The benign character of the neoplasms, for where these were removed no recurrence occurred.

4. The gradual deterioration of the general health, which could not wholly be referred to the disease.

5. The negative results of bacteriological examination and the presence of numerous eosinophile cells in the blood.

He concludes that xeroderma pigmentosum is not a lesion produced by external irritants (cold or sun's rays) nor by any known micro-organisms, but that it is a special dystrophy of the skin of unknown pathogenesis.

Xerostoma.—Battle ²_{Feb. 16, '95} describes a case in which there had been a dry mouth for five years, with intermittent parotitis every three or four weeks for the previous two years. The mouth had been dry at the time of the menopause, both at the tongue and on the mucous membrane of the cheeks. There were no teeth left,

those used being artificial. There was no blockage of Stenon's ducts, as saliva flowed from each. The submaxillary glands had now become enlarged.

Miscellaneous.

Duhring and Hartzell, of Philadelphia,⁵_{Mar., '95} narrate a hitherto-undescribed disease of the skin in a boy, 15 years of age, a mill-hand, who applied at the Hospital of the University of Pennsylvania for the relief of a patch of chronically-inflamed, papular and papulo-ulcerative, slightly-crusted lesions occupying chiefly one side of the neck. The disease had existed three years. The lesions composing the patch, he stated, underwent change from time to time, usually terminating, in the course of several months, in superficial atrophy of the skin in the form of slight, whitish, pitted, irregularly-shaped scars. Itching was not complained of. Upon inspection the disease was found to be peculiar, and a positive diagnosis could not be made. The patch resembled a mild expression of lupus vulgaris verrucosus more than any other well-known disease, and the indolence and slow course of the lesions followed by scarring helped to favor this view. There was no resemblance to acne, acne keloid, sycosis, or tinea sycosis. The regions invaded were the sides of the neck posteriorly, mainly the right side, and to a slight extent the flexor surfaces of the forearm. The patch on the right side of the neck was of an irregular and rounded form, composed of a very large number of discrete and confluent, firm, irregularly-shaped, dull-reddish, chronic papular, papulo-squamous, and papulo-crustaceous lesions, manifestly representing different stages of the disease. Where several of these lesions were aggregated or confluent, small patches were formed. There were some discrete outlying lesions. In several localities a distinct crescentic configuration existed. The diseased area was warty and rough to the touch, owing to the scales and little crusts on the surface of most of the lesions, especially on those in an advanced stage. On removing them small follicular ulcers were noted, the follicular involvement, however, not being obvious to the unaided eye in all the lesions. That the process was a superficially destructive one was shown not only by the slightly-crusted, pit-like excavations, but also by the presence of superficial, whitish, acne-like scars left behind upon the healing of the little ulcers.

Excipients ; Anæsthesia.

Ointments.—Unna, of Hamburg,²⁸_{B. 20, '95} ³⁶_{Aug., '95} has instituted a series of observations with the object of contrasting adeps lanæ and

lanolin, to find out any advantages which one or other possesses. He concludes that in efficiency there is little to choose between them, but that ointments prepared with adeps lanæ are somewhat softer, more easily spread, and thus more economical.

Under the denomination of "casein ointment" Unna²⁸_{B.20, No.10, '96} has prepared an ointment consisting of 14 parts of casein, 0.43 of alkali, 7 of glycerin, 21 of vaselin, 1 of an antiseptic, and enough water to make up 100 parts. It forms a thick and viscid artificial milk, and is intermediate between fat-ointments and varnishes. When applied on the skin the ointment dries so as to form an elastic and very thin coating, and from its richness in fat it can act deeply, unlike the varnishes.

Calcium-salts should not be incorporated with it, nor any considerable amount of acids, for such substances have the inconvenience of coagulating and precipitating casein; thus, not more than 1 per cent. of salicylic acid may be added. Slightly acid substances, such as tars and balsams, may be mixed with it; it is then advisable, at least for the tars, to add some alkaline soap, in the proportion of 1 part of soap for 4 parts of tar. On the other hand, alkalies and alkaline salts, as well as ichthyol, so thicken it that it is necessary to diminish the amount of casein in order to utilize it as a vehicle for such preparations.

Neutral pulverulent substances may be combined with this preparation, provided an equal proportion of vaselin be added. It can likewise be employed for mercurial ointments. As an excipient, in fact, it is recommendable on account of the great facility of its application. Unna has used it with good results, associated with ichthyol, Peruvian balsam, or tar, against all forms of pruritus. It can be used as a protecting varnish and thus serve as a prophylaxis against the action of the sun, as well as in the treatment of ephelides, xeroderma pigmentosum, and in the application of paints.

James⁵⁷⁵_{B.35, p.627, '94} ⁸¹⁴_{Jan.1, '95} states that in applying chrysarobin ointments the clothing is apt to be touched by them, which may give rise to inflammation. To obviate this the author recommends the following preparation of chrysarobin, which he considers an admirable substitute for the ointment form: 1 part of chrysarobin is dissolved in 7 parts of chloroform and 7 parts of linseed-oil added. The preparation is applied with a brush.

Anæsthesia.—Dubreuilh²⁸⁷_{No.4, '95} ¹²⁶_{July 15} states that the best method of obtaining local anæsthesia consists in the injection of a 2-per-cent. solution of cocaine. The injections should be intra-dermic and superficial. In order to make them with ease he recommends the use of needles slightly bent at an angle, which allow the

injection to be made into the derma with greater facility. The maximum dose is 0.06 gramme (1 grain); a medium dose of 0.04 gramme ($\frac{2}{3}$ grain) gives sufficient anæsthesia.

OPHTHALMOLOGY.

By CHARLES A. OLIVER, A.M., M.D.,

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Congenital Anomalies, Embryology, and Histological Anatomy.

A CASE of anophthalmos in a male Hebrew infant with double talipes varus and a defect of the upper extremities resembling club-foot was seen by Ryerson, of Toronto. ⁵⁹_{Jan. 6, '94} At the bottom of the conjunctival sacs were rounded elevations constituting the rudimentary eyeballs. The adnexa were normal.

Landes, of New York, ⁵⁹_{Nov. 3, '94} observed an instance of congenital bilateral anophthalmos in a newborn infant. The author could find no trace of the globes. The appendages were normal. There was a supernumerary digit on each hand and foot. The child lived but a few weeks.

Purtscher, of Klagenfurt, ⁵⁷_{Oct. 28, '94} believes that microphthalmos with cyst of the upper lid is due to the faulty folding of the upper part of the embryonic optic vesicle, according to the Kundrat-Czermak-Mitvalski theory. He has seen complete atrophy of the globe to follow puncture of this cyst in a case where the cyst was connected with the centre of the cornea by a band of tissue.

Five cases of coloboma of the lens in 3 persons, in 2 of whom the condition was found in both eyes, have been reported by Christen, of Basel. ²⁵⁴_{Nov., '94} On account of pathological changes in the second eye, a third case was doubtful. In 4 cases the coloboma was situated below and above, being to the outside in but 1 case. In 2 the zonula of Zinn was complete, it being partially present in one and entirely absent in two. In 2 of the colobomata the capsule was in its normal position, but the lens-matter was wanting, thus showing a mutually independent embryonic development of the lens and of its capsule. The lenticular coloboma was associated with coloboma of the iris in 4 cases, in 3 of which the defects were directed downward and were associated with coloboma of the choroid in the same position. In 2 cases a tremulous iris could be seen. Remains of the pupillary

membrane were seen in 3 instances. One eye was emmetropic. Myopia was present in 2 cases. In 4 of the cases vision was fair and in 1 it was very bad.

Tiffany, of Kansas City, ²¹²⁸_{July, '95} records the occurrence of congenital bilateral ectopia lentis in seven out of a family of nine children. The mother's eyes were unaffected, but the father was stated to have been near-sighted and to have had "something shaking in his eyes." In two of the cases the dislocation was upward and outward; in one it was to the nasal side; in a fourth the lens of one eye was displaced upward and the lens of the other upward and inward; in the fifth the luxation was directly outward; in the sixth it was upward and outward in one eye and outward in the other, and in the seventh both lenses were dislocated directly outward. In all there was iridochoroiditis, slight opacity, and mobility of the lenses with amblyopia. In one eye retained nerve-sheath was present.

An instance of double colobomata of the choroid in the left eye of a woman, aged 24 years, is cited by Veasey, of Philadelphia. ²⁴⁹_{Apr., '95} The smaller of the ectasias was situated near the disc and was nearly round. The larger was oval in form and several times the size of the first. The two defects were separated by a wide area of healthy choroidal tissue, this structure being also normal anterior to the lower defect.

Manz, of Freiburg, ²⁵⁴_{Nov., '94} believes that retained optic-nerve sheaths occur more frequently in neurotic or idiotic persons. In an histological examination of three such cases he found that, although most of the nerve-sheaths end at the lamina cribrosa, yet several bundles of them may pass directly through it. These nerve-sheaths are more apt to follow the course of the blood-vessels, though several single fibres may stretch across into the retina, the varicosities that are seen on these fibres being due to swellings of the axis-cylinder, which are covered by the medullary matter. The small, shining globules at times observed in these cases are connected with the varicosities of the axis-cylinder and are evidences of degeneration of the same. In the cases studied by him the lamina cribrosa was normal.

In a research upon the embryology of the angle of the anterior chamber, in man and in the chick, Gabriélidès ²⁷⁴_{Mar., '95} reaches the following conclusions: 1. The pectinate ligament persists in the chick, but disappears in man toward the end of embryonic life, the place which it occupied forming the angle of the anterior chamber. 2. The posterior wall of the canal of Schlemm is developed from the corneal endothelium in man and in the chick. 3. The ciliary muscle in the chick is composed of two parts,—an anterior and a

posterior; in man, as a rule, there only exists one part, this corresponding to the posterior part of the chick; while in the chick this part is inserted into the canal of Schlemm. In man the muscle is attached at the summit of the angle of the anterior chamber. 4. In the chick the layer of the iris called after Henle is represented by the fine radiated and striated fibres of the dilator muscle. In man this layer is also the dilator muscle; here it is unique and corresponds to the preceding radiated fibres.

In order to obtain positive pictures of the corneal cells in frogs', rabbits', and cats' eyes, Gruber, of Vienna, ²⁵⁴_{Dec., '94} bathes the cornea liberally with a 10-per-cent. solution of hydrochloric acid until a thick, white opacity results from coagulation. The unwashed cornea is then touched with argentic nitrate. After this is done and exposing the cornea to sunlight for twenty-four to forty-eight hours, the author has found a beautiful silver positive coloring of the corneal cells and their branches.

Johnson, of London, ²⁴⁹_{July, '95} recapitulates the results of microscopical examination of perfectly healthy retinæ of individuals of various ages as follows: The membrana vitrea is the limit of the choroid; then follows a space, then the membrana terminans retinæ, then a gelatinous layer in which spherules surrounded by imbedded spherical pigment-granules lie; lastly, there are a series of acicular pigment-crystals which lie in irregular clusters in a plexus. This plexus is a direct continuation of the bacillary layer, and enters the gelatinous layer to terminate at the spherules, which latter seem to be closely connected with and may essentially be found to contain the ultimate terminals of the optic-nerve fibres. At the macula the spherules lie much closer together than in any other part of the retina and nearly touch one another at the fovea centralis.

Græff, of Berlin, ²⁵⁴_{Nov., '94} has found neuroglial spindle-cells in the optic nerve, extending from the optic tract to the periphery of the retina. He states that the body of the cell is small, somewhat drawn out, and star-like, being provided with about twenty fine processes which entwine with the neighboring processes without an anastomosis. The retinal spindle-cells were found only in the ganglion and nerve-fibre layers. The author regards this result as conclusive evidence that the optic nerve and retina are simply prolongations of the brain.

Physiology.

With a view to obtaining further particulars with regard to the corneal circulation, Gruber, of Vienna, ²⁰⁴_{B. 40, H. 4} has performed a series of experiments upon rabbits' eyes. He draws attention to the

necessity of distinguishing between the action of substances which are diffusible and those which possess the property of filtration alone. In regard to the former, there are only three agents which influence the passing of crystalloid bodies in the cornea: (1) the mechanical corneal circulation; (2) the diffusion-stream; (3) the vital action of the tissue. For the first, the presence of a flow to and from the part is necessary. The author considers the cornea to represent a closed circulation-territory complete in itself, and from a study of the hydrostatic phenomena which occur in that region he has concluded that (1) the circulation in the cornea is postero-anteriorly radiatory; (2) the circulation is most sluggish in that portion which borders upon the surface; (3) the circulation is chiefly radiatory in the portion bordering upon the periphery, while more posteriorly the radiatory movement becomes less and the current from behind forward becomes stronger. In Descemet's membrane there is no radiating current, the stream passing straight through it. He also found that a circulation of crystalloid bodies, in contrast with colloid, without considering the vitality of the corneal tissue, is possibly wholly a result of mechanical action and diffusibility. In life, however, he believes that this act is accomplished by the aid of tissue-change. In regard to the circulation of colloid bodies, the author has obtained the same results as Knies. He thinks that the periphery of the cornea is better nourished than the central zone, thus accounting for the resistance which this portion of the membrane offers to inflammatory change, and that the existence and characteristics of a system of lymph-channels is of histological, but not of physiological, interest.

A series of experiments have been made by Bellarminoff and Dolganoff, of St. Petersburg, ²⁰⁴_{B. 40, II. 4} upon the eyes of rabbits to determine the effect of certain pathological conditions upon the diffusion of liquids passed into the interior of the organ. They found that puncture of the cornea, when unaccompanied by any complication, increased the diffusion during the first two days following the operation. This effect of the operation, however, disappeared entirely on the fourth or fifth day. The effect following section of this membrane was more powerful and lasted longer, even after all inflammatory reaction had subsided. At the end of two and a half weeks the filtration effect of the scar-tissue was found to disappear entirely. Iridectomy lengthened the effect, but even here the increase in the diffusion began to lessen after fourteen to sixteen days, and at the end of a month it had also disappeared. The co-efficient of diffusion was much greater in eyes from which the lens had been removed, but only for a short time, when the

action was lost. The coloration of the vitreous which was found in aphakic eyes did not exist in any other class of cases. This property of the lens of preventing the diffusion of substances into the deeper ocular tissues leads the authors to query if the explanation for the general panophthalmitis which occurs after extraction is not found in the absence of the lens, while the suppuration which occurs when that organ is *in situ* is more often limited to the cornea. They state, further, that the lens, with its adnexa, forms a kind of barrier against the invasion of pathological elements. An inflammatory degeneration of a corneal wound was found to lessen the absorptive power, while all inflammatory processes of the cornea very markedly increased the diffusive power of that membrane, the degree standing in direct relationship to the extent and depth of the wound. In regard to non-inflammatory processes, superficial stationary nebulæ of not too great extent were found to have no appreciable effect upon diffusion, while changes which occurred in the deeper layer decreased the diffusive power but to a very slight degree. A leucomatous condition of part or of the entire cornea reduced the diffusion to one-half, the same being true of phthisical eyes. In eyes where the tension had been artificially increased by discission of the lens the diffusive power was lessened. An increased temperature of the external coats of the eyes produced by the application of hot fluids increased diffusion.

Gifford, of Omaha, points out that contraction of the pupils takes place when a forcible effort to close the lids is made, this being best observed in subjects who are blind or nearly so from some disease of the optic nerve, retina, or brain. The contraction is elicited by directing the patient to close the eye while the eyelids are held apart. He is of the opinion, from experiments, that the palpebral portions of the muscle are chiefly concerned in the reaction. He has found it present in some cases of suspected brain-tumor where all other reactions were absent. In such cases it serves to eliminate the possibility of previous use of a mydriatic. He believes that it tends to confirm the views of Mendel and Beehterew as to the origin of the fibres of the facial nerve which supply the orbicularis muscle.

After a series of experiments, Birnbacher, of Gratz,²⁰⁴ has found that the reaction of the retina to staining fluids of cold-blooded animals, especially of *Perca fluvialis*, varies according to its exposure to light. Retinæ exposed to light were stained diffusely and weakly with acid stains and eosin, while the non-exposed retinæ, especially the cones, were deeply stained by the same. The author thinks, therefore, that there is a well-defined element

present in the retina. This material, when acting, he terms acidophil, and non-acidophil when it is not acting.

In the mechanism of accommodation, Schweigger, ²⁵⁴_{Apr., '96} of Berlin, believes that the capsule controls the shape of the lens. The soft lens-substance gives but little resistance to the elasticity of the capsule in youth, but, as the lens-matter becomes denser, it offers more and more resistance. After liquefaction of a senile cataract the lens, through the elasticity of the capsule, again becomes round.

With a view of determining the amplitude of accommodation in the different states of refraction, Fromaget, of Bordeaux, ¹⁷¹_{June, '95} experimented with a series of eight hundred cases, finding that the amplitude of accommodation is greater in hypermetropia, less in emmetropia, and still less in myopia; that this difference is due to the refractive state, and that by the use of the correcting lenses it is diminished in the hypermetrope and increased in the myope. For the determination of the near point the optometer of Badal was used; for the far point, the erect image and skiascopy were used. Continuing some previous observations on the optical changes during accommodation, Tscherning, of Paris, ⁶²_{July, Aug., '95} advances the view that the essential change in accommodation consists in a flattening of the lens near its equator, chiefly at the anterior surface, thereby producing an increase in curvature, at the centre, as a secondary phenomenon.

In re-introducing the Young optometer into ophthalmic practice the same author ⁶²_{Dec., '94} gives an interesting account of its use in determining accommodation in various portions of the pupillary area, as well as the estimation of refraction in localized areas of the pupil. He says that with further study the instrument promises to throw new light upon the mechanism of accommodation.

From a comparative study of the eyes of a great variety of birds and mammalia, with special reference to the structure of the ciliary muscle and of the iris and the shape and size of the lens, Lee ⁶_{Dec. 23, '94} is of the opinion that there is strong evidence that the lens is not altered in shape, but only in position, during the accommodative act.

It is believed by Schirmer, of Greifswald, ²⁰⁴_{B. 40, H. 5} that, after the removal of the acts of convergence and accommodation, as well as of stimuli which are psychical and sensitive, the width of the pupil is regulated not only by the absolute illumination, but also by a third factor,—the adaptation of the retina. In order to determine this the author conducted a series of experiments with a specially-devised pupillometer upon normal eyes in persons ranging from 12 to 22 years of age. He thinks that adaptation is a

process which consists of three factors,—namely: (1) an occurrence in the rods and cones of an unknown nature, (2) the optic effect of the forward movement of the pigment of the retina caused by the illumination, and (3) the pupillary play. The changes of the external illumination without alteration of the retinal adaptation, as well as changes in the retinal adaptation without change of the external illumination, will produce the pupillary reaction. In maximum adaptation the pupillary width remains the same in all illuminations between 100 and 1100 Mk when other irritants are absent. For this width, which varies between three and one-fourth and four millimetres, the author proposes the name of “physiological $\kappa\alpha\tau' \acute{\epsilon}\xi\omicron\chi\eta\nu$.” In the absence of other stimuli the pupillary width and reaction are dependent upon the relation of the external illumination to the condition of the adaptation of the retina. In making these tests the author lays stress upon the importance of keeping the other eye excluded. The patient should fix upon a very small object one and one-half metres distant, the intensity of the illumination being constant and tried with varying powers between 100 and 1100 Mk.

In binocular vision, Jaesche, of Dorpat, ²⁵⁴_{AUG., '95} has discovered that points which are visible to both eyes will be seen at the place of fusion of the visual axes. Both visual axes will appear to meet in a field common to both eyes, while points other than those of the fusion of the visual axes may be determined by the relation which they hold to it. A non-infrequent cause of squint is the habit of holding the head in a faulty position while doing near work, especially when there is a difference in the vision of the eyes. As a result of a series of measurements made with a view of determining any possible differences in the intra-pupillary distance and the space between the inner edges of the optic foramina of the variously shaped cells of several different races, the author has found very little difference between the several groups, though individual deviations were marked. He also determined that the relation between the optic commissure and the centre of movement of the globe is often a factor in the production of strabismus. In a second table, as a result of a study of 1717 dispensary cases divided into those under and those over 20 years of age, and again into myopes, hypermetropes, and presbyopes, he has found that among the myopes the relation of those under 20 years was as 27.2 per cent. to 4.4 per cent.; of hypermetropes, 39.8 per cent. to 6.3 per cent. The author points out that 55.5 per cent. of myopes have a pupillary distance of fifty-six to sixty millimetres as compared with 52.5 per cent. of hypermetropes. In four cases of myopia in youths he saw pupillary distances of over

sixty-five millimetres,—a breadth of base-line which was not found in a single instance among 325 hypermetropes.

Graeff²⁰⁴_{B. 40, H. 5} reiterates his belief in the existence of a third factor in the production of convergence,—*i.e.*, the knowledge of proximity of the object. Schweigger has denied this, admitting only two,—accommodation and the desire for binocular vision. The author thinks that he has proved his belief by the production of convergence in a myope without the action of accommodation or binocular vision. These factors were removed by placing the object fixed beyond the far point and excluding the other. After a series of experiments with specially-devised instruments, Weiss, of Heidelberg,²⁵⁴_{Nov., '94} has constructed a series of tables to show the relation of the external and internal rectus muscles in increasing divergence of the orbit. When the optic foramina are equidistant and the centres of rotation of the globes are equally separated from the optic foramina, the extent of rotation of the internal rectus will decrease in much greater proportion than that of the external rectus will increase, the distance between the centres of the rotation being increased. When the centres of rotation are equally distant from each other and from the optic foramen, the extent of rotation of the internus will increase more rapidly than the extent of the externus will decrease, the distance between the optic foramina being increased. As the distance between the centres of rotation and the optic foramina augment, the other parts being equidistant, the extent of the externus will decrease more rapidly than the rotation of the internus will increase. The sum of the two rotations is increased by an augmentation in the distances between the optic foramina, and lessened by the increased separation of the centres of rotation and by the lengthened distance between the optic foramen and the centres of rotation.

As a result of an experimental study of the position of the eyes during repose, Reboud,²⁷⁴_{Nov., '94} concludes for monocular vision that (1) the experiments show the physiological positions of each eye, rather than its position of rest; (2) convergence with the aid of an accommodative effort (obstacles that can be overcome) is the rule for eyes having a good visual acuity and a clear image; (3) parallelism and divergence, especially the former, are present in most of the positions of rest (61 per cent.). This latter is the position of eyes that are not compelled to accommodate for distinct vision or of those which, upon account of a too great and constant effort, have avoided it. For binocular vision he has determined: 1. An equal degree of acuity in both eyes is the best pledge for their association,—the surest guarantee of binocular vision. Without it (he says) vision is precarious. Its influence

is more marked in those eyes which accommodate the least to see clearly. 2. Astigmatism, after anisometropia, is the greatest enemy of binocular vision. 3. Hyperopic astigmatism, even with good acuity, does not favor convergence, thus differing essentially from hyperopia.

Trietel, of Leipzig, ²⁰⁴_{B.40,H.5} thinks that the term "visual power" should be used solely to denote the uncorrected vision of the eye, while "visual acuity" should express the corrected vision. The differences in visual power are dependent upon (1) the size and separation of the diffusion-circle, (2) the visual acuity, and (3) the psychical power. The size of the diffusion-circles depends upon, first, the structure of the eye; second, the separation of the objects from the far point of the eye, and, third, the size of the pupil. The separation of the circles of diffusion depends upon their size, the structure of the eye, and the separation of the points of light which are presented to the eye. In a series of tables the author shows the average visual power of myopes of various degrees, between certain ages, and of those accustomed and unaccustomed to the use of glasses. In myopes up to 3 dioptries the visual power is greater in persons ranging in age from 15 to 20 years than in those from 9 to 14 years. The converse is true in myopes of more than 3 dioptries. Owing to the difficulty in recognizing the diffusion-circles to which the patient has become unaccustomed, the visual power is decreased by the use of glasses for distance. Glasses should be given for near work, but never for distance. The visual power of compound myopic astigmatism is less than a simple myopia that is equal in degree to its lesser curvature and is greater than one that is equal to its greater curvature.

With a view of determining an average for visual acuity, Buxton, of London, ⁶_{Apr.27,'95} has examined scholars among the upper and middle classes in grammar-schools, private educational establishments, and in private practice, and has found that 63.54 per cent. had good vision in both eyes, 36.45 per cent. subnormal in one or both eyes, and 12.27 per cent. had less than one-half normal in both eyes. Ferdinands, of Aberdeen, ²_{Mar.2,'95} suggests a standard of illumination in order to secure a uniformity in the results obtained by different examiners of the visual acuity of applicants for positions in public service.

Cohn, of Breslau, ¹⁹⁰_{Oct., '94} has devised transparent test-charts which possess the advantages that, by hanging them before a window-pane, they receive good illumination, and, by means of a reflection of their image in a mirror, they may be used at half the distance. Randall, of Philadelphia, ¹¹²_{Apr., '95} has modified the test-card previously

introduced by him. A more decimal series has been adopted. The lines mostly used contain ten or twelve letters; so that a full test of the patient's vision can be made with small element of chance, the deciphering of every letter being insisted upon. He has placed the confusion-letters so as to bring them into some alternation, while the easier ones have been placed at the front of the line, so that the patient may begin correctly and thus indicate at once which line he is attempting. So as to avoid irradiation, the letters are printed upon a card having a cream color verging on an Indian tint.

From carefully-planned experiments bearing upon the oscillatory character of visual impressions, Shelford¹⁰⁰⁶_{Dec., '94} found that apparently, when the retina is exposed to the action of light for a limited time, the complete order of visual phenomena is as follows: 1. Immediately upon the impact of light there is experienced a sensation of luminosity, the intensity of which increases for about one-sixtieth of a second, more rapidly toward the end of that period than at first. 2. Then ensues a sudden reaction, lasting for about one-sixtieth of a second, in virtue of which the retina becomes partially insensible to renewed or continued luminous impressions. These two effects may be repeated in a diminished degree as often as three or four times. 3. The stage of fluctuation is succeeded by a sensation of steady luminosity, the intensity of which is, however, considerably below the mean of that experienced during the first one-sixtieth of a second. 4. After the external light has been shut off, a sensation of diminishing luminosity continues for a short time and is succeeded by a brief interval of darkness. 5. Then follows a sudden and clearly-defined sensation of what may be called abnormal darkness,—darker than common darkness,—which lasts about one-sixtieth of a second and is followed by another interval of ordinary darkness. 6. Finally, in about one-fifth of a second after the extinction of the external light, there occurs another transient impression of luminosity, generally violet-colored, after which the uniformity of the darkness remains undisturbed.

An interesting study of the visual sense in an intelligent male, 26 years of age, has been made by Francke, of Greifswald.²¹⁷_{v.16,'94} Both eyes were micro-ophthalmic and contained soft cataracts. There was marked horizontal nystagmic movements upon both sides. The patient had the sense of touch unusually well developed and was extraordinarily well able to get about without the use of his eyes. His vision was reduced to naming very large objects, and these only when they were brought very near to his eyes. He had a fair idea of distance and was able to call the

colors of large objects by their proper names. Both cataracts were extracted and clear media were obtained. As soon as the eye became quiet a number of objects in common use were held before him, but he was unable to recognize them, although he had been able to sketch some of them correctly before the operation. At the second examination, however, he was able to properly designate all of the objects which he had failed to recognize at the first test. He was unable to judge the size of objects, but attributed the smallness of an object to its distance from the eyes. Color-sense was normal, although any pleasure in this newly-acquired sense he did not make use of at first, but continued groping his way about the room. The amblyopia still persisted, his corrected vision being limited to counting fingers close to the eye. The nystagmus became less marked. The author draws several parallels between his case and those already reported by Uthoff and Hirschberg.

After studying the apparent relation of subjective visual sensations in epilepsy and migraine to the function of the cerebral centres, Gowers, of London, ^{June 22, 29, '95} advances to an exhaustive study of the varied forms in which visual sensations appear in these affections. As a point of practical interest, he states that the limit of the color-fields usually understood as normal obtains only for one-centimetre test-squares, and that the area over which they can be seen increases with the size of the test-object; so that with a six-centimetre square the field for all colors excepting green extends to the limits of the white field.

Patrick, of Chicago, ^{May 27, '95} has devised a color-carrier for examination of the visual fields, made of two slender pieces of hard rubber two inches in length, joined together at one end by a rivet, the other end being expanded into a disc one-half inch in diameter which is countersunk on both sides. Into these depressions pieces of colored felt are cemented.

In a preliminary note upon a few changes found in the fields of vision while the eyes are placed at right angles to their ordinary positions, Oliver, of Philadelphia, ^{Mar. 16, '95} concludes that such a change in the position of the eye practically brings the most sentient portion of the retinal sheet into a situation that allows it to receive impressions from a part of a distant view that ordinarily impinges upon a lower grade of material which gives a less vivid and a less detailed visual picture.

Simon, of Berlin, ^{204 B. 40, H. 4} has performed a series of experiments to determine the point of origin of the so-called contraction of the visual field through fatigue, and is inclined to think that it resides in a deficiency in the psychical powers of perception. The retina

is only concerned in so far that on account of a lessened functional activity the contraction would first be observed in the periphery.

As one of a deputation from the British Medical Association and the Ophthalmological Society of the United Kingdom to the President of the Board of Trade, to urge the adoption of more accurate tests to eyesight in the examination of railway-servants and mariners, Argyll-Robertson, of Edinburgh, ⁶_{Feb., '95} states that such tests should elicit three conditions: (1) the acuteness of vision possessed by the applicant; (2) the condition of the refraction of the candidates' eyes; (3) the acuteness of color-perception. Hess and Preton, of Prague, ²⁰⁴_{B. 40, H. 4} have conducted a series of quantitative investigations into the laws which regulate simultaneous contrasts of light and shade. For this purpose they employed an apparatus which presented to the eye of the observer a rectangular, vertical, white field, divided by a very fine mesial line into two equal squares. The centre of each square was perforated by a sharply-defined, small, square hole, behind which another white field was placed, appearing to monocular examinations as though it were situated in the same plane. The apparatus was so constructed that all four fields could be equally lighted, and when this occurred the small squares could not be distinguished on the larger. As a result of these experiments, the authors conclude that a small field surrounded by a field of different brightness shows an apparent brightness which depends partly on its own intensity and partly upon the effect of contrast; also that this apparent intensity remains the same if, in changing the illumination of both fields, the relative difference (the proportion of the increase of the illumination of both fields) remains the same, and that it is independent of the absolute amount of change of illumination of both fields.

Rockcliffe, of Hull, ⁶_{Feb. 23, '95} cites several instances demonstrating that not only ought our railway-officials and seamen to be examined by competent persons before they commence their career, but that these examinations should be continued from time to time while the employés are following their various vocations.

Two cases of disqualification of employés of years' standing in railway- and marine service, owing to visual defects which probably had been present for many years, have been reported by Crawford, of London. ²_{Mar. 23, '95} Sinclair, of Ipswich, ⁶_{Mar. 30, '95} in regard to Gowers's query, "Has any accident been brought home to defect in color-vision?" cites six recorded instances, in one of which there was tobacco-amblyopia and another in which there was also an acquired defect. Beetz, ³⁴_{Mar. 5, '95} thinks that a blue light when viewed in a fog appears red, owing to the absorption of the more

highly refrangible blue rays, for the same reason that the sun appears red through a dense mist. Glasses of a sufficient thickness to allow an equal amount of light to pass through affected the passage of light as follows: Red glass allowed the passage of much red, a little yellow, and almost no green to violet; whereas green glass absorbed red, blue, and violet and allowed the passage largely to yellow, orange, and green. Blue glass allowed the passage of a band of red only from the region of Fraunhofer's line C., a little green, much blue, and violet. In this experiment the more refrangible red and yellow were absent. The author thinks, therefore, that, as red is seen farther by lessened illumination, a blue light may appear red to the normal eye. A blue glass can be made of such thickness that light will be suffered to emanate in a quantity that is sufficient to prevent this possible mistake.

Based upon a long series of carefully-conducted experiments upon the indirect color-range of children and adults, Luckey²⁶³_{V. 6, No. 4} concludes: 1. That children cannot see colors as far in indirect vision as adults, but as compared with adults they show a greater proportional range for black and white than for color. 2. Difference in sex seems to make no perceptible difference in the extent of the color-range. 3. Color-training does not seem to increase the color-range (except in the case of red), but makes itself felt in a greater variety of shades and tints, as seen in indirect vision.

In a series of experiments upon the sensibility of the retina for different colors of the spectrum, Parinaud¹⁷¹_{Oct., '94} has confirmed the results which he had previously attained. He compares the sensibility of the retina which has been exposed to diffuse daylight ("non-adapted retina") with that of the retina which has been in darkness for twenty minutes ("adapted retina"), taking successively each color of the spectrum. In each case the sensibility for red rays is the same; but, as vision goes toward the violet, the difference becomes very marked in favor of the "adapted retina," becoming, at the line G of the spectrum, as 15 to 1. This increase in sensibility affects only the luminous intensity of the color, which, while appearing more luminous, becomes less saturated. This increase of sensibility does not hold good for the fovea, where simple lights primarily produce a sensation of color. The absence of the rods and of the visual purple in the fovea and their presence in the remaining portions of the retina would thus indicate that to them is due this increase in sensibility of the adapted retina, and that the rods give only a sensation of colorless light. To them, consequently, is due the ability to see at night, and this is further confirmed by the absence of the visual purple in hemeralopes, both in man and animal. To the cones, on the other hand,

he gives the especial function of receiving impressions of color, although the recognition of difference in color he believes to be a function of the brain. Finally, the action of the visual purple is of the nature of phenomena of fluorescence, or phosphorescence, thus explaining the increase of sensibility of the adapted retina (where the visual purple has had time to be formed) for violet rays, since they are the ones which are the most apt to develop fluorescence.

In his explanation of the theory of color Nicati ²⁷⁴_{Jan., '95} divides the elements of the retina into three varieties, corresponding to the three cellular layers (the rods and cones of the external layer, the bi- and uni-polar cells of the middle layer, and the multipolar cells of the internal layer). To these varieties he proposes the names (1) electroblasts (external layer), (2) octoblasts (middle layer), and (3) synoptoblasts (internal layer). He says that upon the electroblasts there is deposited a chemical substance which is capable of being acted upon by light. The visual energy of the retina at a given point would be succeeded by a relative insensibility during a period that is necessary to the complete organic recuperation. The seat of this reflex action is supposed to be in the *synoptoblasts*, or multipolar cells of the third retinal layer. These are under the control of a higher cerebral centre, which is stimulated by the perception of light. As minor propositions, the author has demonstrated that the scale of tension in color is the scale of resistance to the chemical effects of light upon the photopsine. The scale of warmth—the heat and cold of the painters—may be attributed to the changing colors of the retinal purple and to the absorptions which they provoke. To this he gives the general name of *photopsine*, which is composed of the visual purple, or *chromophotopsine*, reacting to colored light, and of *hyalophotopsine*, reacting to colorless light. By the action of light upon the photopsine the luminous energy is transformed into an electric energy, which creates the impression of vision. The electric currents thus generated vary in quantity and in electro-motor force with the color of the light producing the current,—i.e., the short radiations, with intense and rapid action (violet), will develop currents of great quantity, but of little tension, and the long radiations, with a minimum photochemical action (red), will develop currents of small quantity, but of extreme tension. To the optoblast-cells is given the function of transmuting the electric energy into nervous energy. The bipolar cells are supposed to be excited by colored light, the unipolar by colorless light. The paths connecting the electroblasts and optoblasts vary in length and thickness. The currents of large quantity and low

tension will go by the short, broad paths. The currents of small quantity and high tension pass by the long, narrow paths. Certain of the optoblasts, then, will always be excited by the blue, certain others by the green or the red lights, and, finally, from habit, they will respond to these colors alone. A differentiation will be the necessary consequence, each optoblast being supposed to be in distinct communication with the centres of perception in the brain. Reber, of Pottsville, has studied a case of hereditary color-blindness in a woman, 50 years of age, all the members of one branch of whose family possessed subnormal color-perception, while on the paternal side an uncle and three aunts and on the maternal side an uncle were similarly affected. Of the patient's children, two of three sons were affected, one of whom was a twin brother of the one free from the defect. A third child, a girl, was unaffected. A review of the genealogy shows the following interesting features: The involvement of two entire families in color-blindness and the occurrence of six cases of subnormal color-perception in females within two generations.

Lombroso and Levi, of Florence, ⁶⁵⁰_{Nov., '94} believe that the electrical reaction of the eye is best taken with a broad electrode placed flat on the back of the neck in conjunction with a small square one, 3 centimetres in diameter, fastened upon the eye by an elastic band. They have found that vision does not change in hysteria and neurasthenia, but that the relative sensibility of the two eyes is, however, always different.

Errors of Refraction and Accommodation.

Burnett, of Washington, ¹¹⁶¹_{Nov., '94} states that it has been agreed, by those who have been interested in the discussion and introduction of the new, or dioptral, system of measuring prism employed in ophthalmic practice, to adopt the symbol Δ (the form of the Greek letter *delta*) to designate prisms.

C. F. Prentice, of New York, ¹⁰⁰⁷_{Jan., '95} points out that the problem introduced by cemented bifocal lenses of vertical prismatic action may be solved by the law that a lens decentred one centimetre will produce as many prism dioptries as the lens has dioptries of refraction.

The following plan for measuring heterophoria is pursued by Norton, of Lewiston, Me. ¹⁰⁰⁷_{May, '95}: A point of light is viewed through a disc having two semicylindrical grooves at right angles placed before one eye and a red glass before the other. If the red dot does not appear to be on either of the lines, the author says that the disc should be rotated until the line which was nearest appears to pass through the red dot. The angle of rotation which indicates the angle of deviation is then read off.

Katz²¹_{Nov. 8, '94} has found that, in order to get the best vision with a stenopaic slit, the width of the opening must be correspondingly narrower as the degree of ametropia grows higher. The author employs the same method in determining the degree of ametropia in astigmatism as well as in the differentiation of amblyopia.

From an examination of 500 eyes with the ophthalmometer, Jackson, of Philadelphia,¹⁰¹⁸_{Oct., '94} has found that 6 per cent. of all cases show that the corneal astigmatism corresponds with the total astigmatism both as to amount and as to the direction of the principal meridians; in 16.6 per cent. additional the amount of corneal astigmatism exactly equals the total, and in 41.6 per cent. the difference equals 0.50 dioptré or less. Of the 77.4 per cent. in which the corneal astigmatism does not correspond with the total, the former is in excess in 62 per cent. and the latter in 15.4 per cent. In 34.6 per cent. the instrument indicates the direction of the total astigmatism.

Parent, of Paris,¹⁷¹_{May, '95} reviews the principal objective methods of measuring refractive errors, and describes the following five methods based on the ophthalmoscopical examination: 1. Apparent displacement of the vessels of the upright, or inverted, image with regard to the observer's movements. 2. Parallaxic displacement of the inverted image, with regard to the movement of the objective lens. 3. Variation in size of the inverted image in spherical ametropia and variations in the shape of the image in astigmatic ametropia, when the lens is moved away from the eye under observation. Determination of the artificial far point where the inverted image is found. 4. Observation of the erect image. 5. Skiascopy. The first method gives no exact result, and can only determine the nature of the ametropia and approximately its degree; while the second method allows astigmatism of 1 dioptré or more to be exactly estimated. The third method, under favorable conditions, permits the determination of astigmatism of more than 2 dioptrés, and gives the diagnosis of other states of refraction. For the fourth method the author uses a refraction-ophthalmoscope containing a large number of spherical lenses and cross-cylinders.

Andogsky and Dolganoff, of St. Petersburg,¹⁷¹_{Nov., '94} show that in one hundred and fifty eyes affected with astigmatism the amount of astigmatism, as measured by the ophthalmometer (of Javal-Schiötz), was greater by 0.50 dioptré, on an average, than that found subjectively by glasses, during paralysis of the accommodation by atropine or scopolamine. The degree of accommodative spasm was found to vary with the astigmatism. In hypermetropic and in mixed forms it varied from 0.60 to 1 dioptré, while in

myopic forms it was from 0 to 0.10 dioptre. The degree of the return of spasm varied also with the form of astigmatism, being absent in the majority of myopes and equal to one-half or one-third of the entire spasm in hypermetropes. The axes as determined by the ophthalmometer must be inclined from 5 degrees to 10 degrees in the correcting glasses. In their work in Belarminoff's clinic an attempt was made to obtain the correction in every case without mydriasis. The degree of astigmatism and the principal axis were first obtained by the ophthalmometer. Cylinders of 0.50 dioptre less strength were placed in frames before the patient's eyes and the proper combination of spherical glass was sought for. If the accommodative spasm were too manifest, mydriatics were ordered; if not, glasses were ordered immediately, the spasm being allowed for, according to the age of the patient. This method was very successful in its results and of great value in reducing the number of cases requiring mydriasis.

Davis, of New York, ¹_{Feb. 16, '96} employs double movable mires on the Javal-Schiötz ophthalmometer. In the old model the one mire remained fixed at 20 degrees from the centre of the arc, but the author points out that, as the human cornea is never, or very rarely, of just the radius of curvature to allow the graduated mire to come exactly to 20 degrees on its respective side (the same distance as the fixed mire on the opposite side), in order to have the images touch, any improvement that keeps both mires at the same distance from the centre of the arc in every case, whatsoever the curvature of cornea may be, is a decided advantage. He has found that, in low degrees of hypermetropia and myopia with an astigmatism of from 1 to 4 dioptres, the readings differ but slightly from those that are found with the old instrument; but where the astigmatism is of high degree, and where it is associated with high degrees of hypermetropia or myopia (where the angle *alpha* is usually large), the readings differ as much as 1 dioptre, the double mires giving the less amount and corresponding more closely with the findings of subjective tests.

Weiland, of Philadelphia, ²⁴⁹_{July, '96} advocates the substitution of a straight arm for the arc in Javal's ophthalmometer, and, in order to obviate the difficulty in reading the graduations which follow the change, he has added a second graduated bar below the straight arm. A further alteration consists in the substitution of two movable yellow mires of the same size for the stepped white mires, the object being to produce contact in each meridian, to quench the blue rays which interfere most with exact contact, and to permit of the measuring of the angle *alpha*.

To facilitate retinoscopy, Marple, of New York, ⁵⁹_{Mar. 2, '96} has

devised a lens-holder. The contrivance consists of a frame containing a series of lenses, which the patient holds in the hand before the eye under examination.

In considering the various causes of asthenopia, Buller, of Montreal, ³¹⁷_{Nov., '94} does not think that we are justified in assuming such a condition as asthenopia of centric origin until we can define the centric lesions upon which it is supposed to depend or which are known to give rise to asthenopic symptoms. Chauvel, of Algiers, ¹⁷³_{July, '95} cites 18 instances of accommodative asthenopia; 11 of these were sick, suffering, anæmic, or cachectic from long-existing pains; all complained of pain in reading and in near work, as well as of distress in strong light, with fogging of vision. Visual acuity was normal in 20 out of the 36 eyes; equal to one-half in 12 and to one-third in 4. Of 30, 15 eyes were emmetropic, 12 were myopic, and 3 showed a low degree of hypermetropia. Regular astigmatism existed in 7 cases. The amplitude of accommodation was below normal in all and varied with the age of the patient. The majority required a convex spherical glass for near work, and in many the trouble disappeared with the use of such a correction and the employment of general tonics.

From an analysis of one hundred cases of blepharitis, Clarke, of London, ⁷⁶_{Nov., '94} concludes that blepharitis is essentially a disease of youth, and that when it is present in older patients it has existed since youth. It is an expression of asthenopia, the result of an invariably present ametropia. Just as asthenopia shows itself as headache or ocular pain in those whose nervous system is so constituted, so in others, especially strumous patients and those who exhibit a tendency to eczema, does asthenopia mark its presence by blepharitis.

A curious instance of hereditary transmission of astigmatism is cited by McGillivray, of Dundee, ⁶_{Aug., '95}. The anomaly first appeared in the male parent, skipped the next generation, and appeared in the males of the third and fourth generations, being transmitted by the females like hæmophilia or pseudohypertrophic paralysis. According to Howe, of Buffalo, ⁵⁹_{Feb. 9, '95} astigmatism is acquired by artists from their habit of stepping back from their work frequently and viewing it with pinched lids. He believes that this compression of the globe by the lids will, in the course of time, produce a change in the form of the cornea. Perry, of Oneida, ¹⁰⁰⁷_{Aug., '95} has obtained results by experiment confirmatory of the opinion that astigmatism, according to the rule, is habitually corrected by partially closing the eyelids, and consequently is not so productive of asthenopia and accompanying reflex symptoms as astigmatism against the rule where autocorrection is impossible. Lowe ²_{Nov. 17, '94} believes that any reflex

symptoms are more marked in low grades of astigmatism than in high degrees, and attributes this to the fact that, in the former class, perfect vision can be obtained by focusing; whereas in the latter this result cannot be secured, and consequently the attempt is not persisted in.

Woodruff, of Fort Sheridan, ⁶¹_{Nov. 24, '94} asserts that persons with errors of refraction can assure themselves that no correcting lenses are needed in microscopical work except, perhaps, in astigmatism of high grade, and then only when using the lower powers. He attributes the correction of the observers' astigmatic error to the optical principles by which the microscope is given penetrating power. In order to demonstrate the validity of the claim that in oblique astigmatism there is rotation of the retinal images, Wilson, of Detroit, ⁷⁷⁶_{July, '95} has taken a series of pictures with astigmatic lenses with the axis of the cylinder obliquely placed. The results obtained show that all objects are distorted and marked by the predominance of the diffusion lines (ellipses) running parallel to the meridian of least curvature, and, as far as the author can observe, they only serve to corroborate what other critics of Savage's theories have already demonstrated. From the result obtained in a series of experiments performed by Lowry, of Nashville, ¹⁰⁰⁷_{Aug., '95} this author is of the opinion that photographic demonstrations have added very conclusive evidence that in oblique astigmatism the retinal images of vertical and horizontal objects deviate from their normal direction. It has been found by Steiger, of Zürich, ²¹⁴_{Aug. 15, '95} that the corneal refraction and the pupillary distance have a definite interdependent relation. In the etiology of astigmatism, heredity and the changing corneal curvature which occurs during the growth of the individual are important factors.

Suker, of Toledo, ⁴¹_{Feb. 9, '95} enumerates the following causes of spasm of accommodation: Working with minute objects which can only be seen distinctly when brought closer to the eye than the normal punctum proximum; irritation of the ciliary muscles and nerves; insufficiency of the recti interni; various kinds of traumatism; morphine and calabar bean; the effort to overcome diplopia, especially in recent cases; the early stages of homatropine, mydriasis; certain hyperæsthetic conditions of the retina, and inflammatory conditions of the conjunctiva, cornea, or sclera.

Marlow, of Syracuse, ¹_{July, '95} has made a careful study of the errors of refraction and some of the related symptoms in 2000 eyes. He has found simple hypermetropia to constitute about 9 per cent. of the far-sighted eyes, while simple myopia exists in only one-third of 1 per cent. of the near-sighted eyes. He states that in this latter anomaly we find astigmatism, anisometropia, and heterophoria

more frequently than in other forms of ametropia; and, since the myopia has developed in eyes that were originally hypermetropic, the myopic process has evidently selected those individuals in whom astigmatism, anisometropia, and heterophoria were present. In consequence, in myopia we find two groups of conditions: (1) a congenital group, consisting of one or more of the three previously mentioned anomalies, and (2) an acquired group, where the pathological elongation of the eyeball characteristic of the myopic eye and the changes that are secondary to it.

Swasey, of Worcester, ⁹⁹_{Oct. 25, '94} has examined the eyes of 220 school-children, and has found 120 possessed of normal sight ($\frac{2}{2} \frac{0}{0}$ to $\frac{2}{1} \frac{0}{5}$) in both eyes, 30 in one eye, and the remainder with subnormal vision in both eyes. There were 66 eyes with simple hypermetropia in the first class and 36 with hypermetropia in the remaining eyes. The author places great confidence in the ophthalmometer and finds an advantage in discarding the shield from the unobserved eye.

It is believed by Schoen, of Leipzig, ²⁵⁴_{Apr., '95} that accommodative strain from hypermetropia and astigmatism may result in simple cyclitis and chorio-retinitis oræ, which are capable of being cured by the adjustment of proper spectacles and the application of cocaine and atropine. Women have a predisposition to iritis serosa, while men acquire it in rheumatism and syphilis, the accommodative strain acting merely as the excitant. He thinks that this strain may produce pathological changes in the ora serrata, which favor prolapse of the lens and protrusion of the iris and finally lead to obliteration of the anterior chamber and the production of absolute glaucoma. The dynamic refraction and astigmatism of the eye are increased. Glaucoma generally occurs in hypermetropic eyes, and the process can frequently be permanently checked by the correction of the hypermetropia and astigmatism of the affected eye.

Acher, of Frankfort-on-the-Main, ²¹⁷_{v. 16, '94} has attempted to add to our knowledge of the genesis of myopia by experiments upon the eyes of rabbits. He claims to have disproved the action of convergence in producing myopia by finding the length of the globe unaffected after it had been sewed into a converging position for four or five months. The action of accommodation was also excluded by noting any change in the form of the eye after a cramp of the ciliary muscle had been maintained for several months by the use of eserine. The author also states that Stilling's theory is also insufficient to account for the production of this condition. He, however, advances no hypothesis himself in regard to its genesis.

In a careful study of the pathogenesis of myopia Bitzos ²³²_{July 15, '96}

rejects the explanation of simple axial elongation, and considers that the crescent of uncovered sclerotic at the posterior pole arises from an equal and general distension of the sclera. As a consequence of the non-extensible choroid refusing to stretch, this membrane gives way at its point of lesser attachment,—*i.e.*, the circumference of the porus opticus, the anterior attachment of the iris angle being much more secure. In the etiology of myopia, Trouseau, of Paris, ³¹_{Mar. 16, '95} thinks that heredity is of the first importance, as it impresses on the globe a developmental tendency which shows itself principally in adolescence. He claims that the use of the eyes for near work is of secondary value. Batten, of London, ²_{July 13, '96} asserts that a special form of myopic fundus is found associated with certain diseases of the nose and pharynx, the chief characteristics of which are the existence of localized posterior staphyloma at or in the immediate neighborhood of the optic disc or in the nasal side of the fundus, the tilting of the optic disc in the direction of the staphyloma, and the œdematous condition of the more prominent margin of the optic disc. The conditions with which he associates these changes are adenoid vegetations, enlarged tonsils, deviation of the septum, blows on the nose and forehead, ozæna, syphilitic disease of the nasal bones, and chronic otorrhœa. Wherry, of London, ¹⁵_{Nov., '94} cites several cases which show the evil effects of constipation upon myopic eyes.

In a case of high myopia (20 dioptries) with partially luxated lenses and marked choroiditis in a boy, aged 19 years, Alt, of St. Louis, ³⁴⁷_{June, '96} has been prompted to perform discission of the lenses owing to amblyopia, increase in tension, and laxity of the suspensory ligament. The operation was first performed in the right eye and the resulting vision equalled $\frac{2}{5}$. Later the left lens was needled, but the retina became detached.

Kuhn ³¹_{Nov. 10, '94} has been able to arrest the chorio-retinal changes and the progress of the disease in progressive myopia by doing sclerotomy as advised by Dehenne. He recommends the performance of this operation when opacities appear in the vitreous and when there is marked visual disturbance. Wray, of Northend, Croydon, ²_{Feb. 9, '96} gives the statistics of 126 cases of myopia (246 eyes) with especial reference to the points upon which the advisability of the operation of removal of the lens are based. Of this number, 38 cases, including 3 cases of detached retina, had vision of less than $\frac{6}{32}$ in one eye, and ten had vision of less than $\frac{6}{32}$ in both eyes. His figures admit of three deductions: that the vision was invariably less in the fourth decade than in the third, that retinal detachment is less to be feared than the changes in the retina and choroid, and that it is not necessary to regard every

myope of 12 dioptries and upward as hopelessly drifting toward detached retina and blindness. He has seen retinal detachments follow the removal of a lens in a case of myopia of 30 dioptries, and believes that detachment of the retina is comparatively frequent after operation. He further thinks that fundus-changes progress more rapidly than they would in all probability have done in the natural course of events. He has found unanimity in the view that patients are able to work much better after the operation.

For the following reasons, Gallemaerts, of Brussels, ⁸⁶⁸_{Mar. 30, '95} believes that extraction of the lens in high grades of myopia is not a good practice:—

1. The operation in itself involves some danger, despite modern antiseptic methods.

2. There is a risk of producing glaucoma or, later, a series of small hæmorrhages, which will lower vision.

3. Unless the myopia is between 18 and 20 dioptries there will still remain some myopia or perhaps hypermetropia, and while removing the power of accommodation the adherents of the operation hope to prevent the increase of the myopia and to prevent detachment of the retina; practically these results are not obtained.

4. The improvement of vision obtained by many is not sufficient to warrant the danger of the operation.

In certain cases of high myopia, de Wecker and Masselon, of Paris, ¹⁷¹_{Feb., '95} recommend the use of a convex lens for temporary purposes in distant vision. The lens is to be held at such a distance from the better eye that its focus will coincide with its far point. In this way the rays appear to come from infinity, and a large, inverted image is obtained. This inversion is corrected by the employment of suitable prisms used conjointly with the spherical lens.

As a means of diagnosis of acquired myopia due to a senile sclerosis of the lens or to commencing cataract, Antonelli, of Naples, ¹⁷³_{Sept., '95} calls attention to the presence of a shadow, in the form of a linear crescent, in the pupillary field, seen during a skiascopic investigation. It is best visible with a feeble illumination, the observer being stationed at a distance of one metre and the patient's eye looking in a slightly oblique direction. Then, as the disc of light from a plain mirror is displaced from the temple toward the nose of the patient, a shadow, in the form of a crescent, which moves in an opposite direction to that of the mirror, appears in the nasal border of the pupil. This shadow is different from the paracentral shadow described by Bitzos, which is due to a

change in the sphericity of the globe, and is produced by the total reflection of rays falling obliquely upon the lenticular equator from the anterior surface of the sclerotic nucleus of the lens. In many cases a central shaded disc, surrounded by a peripheral brighter zone, can be seen when the patient looks directly into the eye of the observer and when the pupil is illuminated by a faint light. The author claims that beginning cataract can be diagnosed by this means before any opacity of the lens can be discovered by direct ophthalmoscopical examination.

With a view of establishing the true refractive condition of aphakial eyes, Truc, of Montpellier, ¹⁷¹_{May, '96} has made experiments on rabbits. He has found the aphakial eye to be lighter by 0.20 gramme (3 grains) than its fellow, smaller by 0.13 centimetre, and shorter by 0.6 millimetre. The aqueous does not completely replace the lens, and the diminution in the refractive power is due not only to the extraction of the lens, but to the retraction of the globe (an axial hypermetropia of about 2 dioptries being produced). De Wecker, of Paris, ¹⁷¹_{May, '96} does not think that the rigid sclera of old men would allow of the retraction of the globe noticed by Truc in rabbits.

In an article on astigmatism following cataract extraction, Martin, of Bordeaux, ¹⁷¹_{Mar., '96} dwells first on the word "astigma," which he has introduced in place of "astigmatism." He believes the former to be the better name, because the latter is derived from *ἀ-στίγμα*, a prick or sting, and not a point, for which the proper name is *στίγμα*, thus giving "astigma" as its derivative; by adopting this name the designation of the condition will be brought in accord with the instruments for measuring its degree, which are called astigmometers, and not astigmmometers. The author records a case in which the astigma after extraction became stationary in two and one-half months. There was an increase of 1 dioptre about six months later, following discission. The degree of the astigma did not become fixed until nearly one year after the primary operation.

Prentice, of New York, ¹⁰⁰⁷_{Jan., '96} directs attention to the advantages of toric lenses in astigmatic aphakia. He says that they retain the nodal points of the refracting system, as obtained in the test made with the trial lenses; while they, in a large measure, remove the unpleasant phenomena of internal reflection caused by extreme bulging forward of the convex element, which has the disadvantage of having its surface exposed to light coming from other directions than that of the desired central incident ray. A series of nine cases of nocturnal enuresis cured by a careful correction of refraction error is reported by Gould, of Philadelphia. ⁹_{Dec. 15, '94}

Diseases of the Orbit.

Mazza, of Genoa, ⁷⁸_{Oct. 31, '94} gives the clinical history of six cases of primary tenonitis, the characteristic symptoms of which were swelling of the lids and conjunctivitis. The swelling of the conjunctiva was especially marked below, but it was not attended with discharge. The author thinks that the principal point in treatment is free incision, even complete peritomy (through the capsule) to prevent injury of the nerve by pressure.

A case of orbital ophthalmoplegia following traumatism of the globe has been reported by Vignes, of Paris. ²⁷⁴_{Oct., '94} The author considers the cause of the paresis to have been traction on the nerves as the result of the injury.

Van Duyse, of Gand, and Bribosia, of Namur, ²⁷⁴_{Mar., '95} cite an instance of unilateral enophthalmos with marked exophthalmos, appearing upon exertion or upon pressure upon the jugular vein. The condition was the result of a blow upon the eye some months previously. At the moment of extreme protrusion, when the pupil suddenly dilated, there was diplopia and marked reduction of vision, with pain. The projection lasted some seconds, though the eyeball could be replaced by pressure. The authors consider the enophthalmos to have been due to a post-traumatic trophoneurotic disturbance, producing gradual absorption of the fat of the orbit. According to them, the disturbance of this tissue results in a varicose dilatation of the retro-ocular veins, which causes the enophthalmos when the intra-vascular tension of the veins of the head is increased by efforts or by compression of the jugulars. The dilatation of the pupil is produced by reflex irritation of the sympathetic, originating in the ciliary nerves by traction of the protruded eye.

A case of intermittent exophthalmos has been seen by Richter, of Munich, ²⁵⁴_{June, '95} in a healthy girl 14 years old. The eye could be made to protrude by compressing the right jugular vein as well as by the act of stooping. The ophthalmoscope and stethoscope revealed nothing abnormal. The author thinks that the condition depended upon a varicose dilatation of the orbital veins. This diagnosis was strengthened by the appearance of a small hæmorrhage into the lower lid after a prolonged examination.

An instance of traumatic ophthalmoplegia occurring in a 17-year-old youth has been seen by Vossius, of Giessen. ²¹⁷_{V. 16, '94} This is of interest on account of: 1. The almost complete monocular ophthalmoplegia and binocular amblyopia of moderate degree, which appeared as the result of a blow upon the left infra-orbital region with the blunt end of a lance. (There was no proptosis and the fundus remained normal.) 2. The almost total disappearance of

the ophthalmoplegia to a slight degree of mydriasis and paresis of the accommodation and of the superior rectus. Vision was completely restored. The author accounts for the condition by a fracture of the superior wall of the orbit, involving the optic foramen and producing a hæmorrhage of sufficient extent to compress the nerves supplying the muscles to such an extent that their function was, for the time, abolished.

Rohmer, of Nancy, ¹⁷¹_{May, '95} reports the case of a patient who, for four years, suffered from a dilatation of the ethmoidal sinus. The author's conclusions are as follow: 1. The distension of the ethmoidal sinus can be recognized, before its opening, by a projection of the internal wall of the orbit. This projection may be more or less sensitive or even painful, and may extend toward the bottom of the orbital cavity. Vigorous pressure upon it may produce parchment-like crepitation, which will help to exclude the diagnosis of a true tumor of the orbit. Owing to compression on the ophthalmic vein, the œdema will be principally of the lower lid and toward the malar and temporal regions. Lesions of the optic nerve, by compression or by extension of inflammation, will appear very late in affections of the ethmoidal or frontal sinuses, while they will manifest themselves early in affections of the sphenoidal sinus. Meningeal affections, as well as inflammation of the ophthalmic vein and of the cavernous sinus, are much more frequent in lesions of the sphenoid bone. Nasal catheterization and large openings on the side of the orbit will localize the lesion and confirm the diagnosis.

Two cases of orbital periostitis in young infants (in one of which there was suppuration), due to hereditary syphilis, are recorded by Ripault, of Paris. ¹⁵²_{Feb. 1, '95}

A case of empyema of the antrum of Highmore and orbital osteoperiostitis, caused by a carious tooth, has been reported by Valude, of Paris. ¹⁷_{June 22, '95} The condition was relieved by incision and drainage, but recurrence necessitated the removal of two-thirds of the floor of the orbit. Vision remained normal throughout.

Spalding, of Portland, ²⁴⁹_{Jan., '95} reports a case of empyema of the orbit due to extension of disease from a necrosis of the alveolar process of the superior maxilla originally excited by exposure to phosphorous fumes. The patient was an adult female who, seven months previously, had had a large sequestrum removed from between the plates of the superior maxilla. The eye was enucleated and a large amount of offensive pus escaped from the orbit. The floor of the orbital cavity was necrosed. The patient died about six months later from paralysis and exhaustion.

An instance of empyema of the maxillary sinus, complicated

by orbital periostitis and perforation of the vault of that cavity, has been reported by Panas, of Paris.²⁷⁴_{Mar., '96} The abscess in the bone, which had originated from a carious tooth, was attended with symptoms of an intense orbital cellulitis. The maxillary sinus was freely opened, giving egress to a large quantity of pus; but, the orbital condition remaining still unrelieved, an incision was made deep into the orbit. Although the local condition improved, symptoms of meningitis supervened and death ensued. The autopsy revealed an abscess of the frontal lobe of the brain and atrophy of the optic nerve. A microscopical examination of the optic nerve, within the optic canal, showed a round-cell infiltration beneath the sheath of the nerve, and resulting Wallerian degeneration of the nerve, without, however, any interstitial neuritis. The intra-cranial portion of the nerve was flattened and reduced in size. Gruening, of New York,¹¹⁷¹_{Jan., '96} operated upon a case of empyema of the ethmoidal cells in a boy 14 years of age. An incision was made over the swelling and a large cavity in the ethmoidal body, containing creamy, inodorous pus, was evacuated. The floor of the ethmoid was then perforated and a communication with the nose established. Daily irrigations with a solution of permanganate of potash effected a cure in three weeks' time. The advantages claimed by the author for the orbital operation over the intra-nasal are as follow: 1. The possibility of a more direct inspection and exploration of the ethmoidal spaces. 2. The greater facility of removing granulations, polypi, and carious bone. 3. The better chance of securing drainage by a counter-opening,—i.e., by perforating the floor of the ethmoidal body from above.

A case of suppurative tenonitis, caused by the pneumococcus of Fraenkel, has been reported by Gasparrini, of Siena.³⁰_{Jan., '95} The patient, a girl 19 years old, had been treated for an acute catarrhal conjunctivitis and a corneal ulcer. The conjunctival inflammation improved under treatment, but a redness in the region of the sac extended over the inner third of the lower lid. There was sharp, piercing pain which appeared to be retrobulbar, pericorneal injection, and marked chemosis. The corneal and aqueous humor remained transparent, the iris reacted normally to light, and the eye became very sensitive to pressure, while the globe was pushed forward and its movements were limited. At this stage there was a slight chill followed by a rise of temperature with a maximum of 39° C. (102.2° F.). At the height of the fever a small aperture formed spontaneously near the middle of the lower lid, about four millimetres from its free border, from which a large quantity of sero-purulent fluid issued. The sinus thus formed was curetted and a platinum wire was introduced, determining the cavity to be

limited on one side by the globe and covered by a membrane. There was no communication between this cavity and the lachrymal sac. The cure was spontaneous after evacuation, which occupied about a month. As the result of cultures made from the evacuated material, the only germs found were encapsulated diplococci and pus-cells. Three rabbits were also inoculated with the material,—two into the anterior chamber and one subcutaneously, the third dying in three days. In the animal's blood and pericardial effusion were found the diplococci of Fraenkel in pure culture. The inoculated eye of the other two rabbits showed inflammatory changes, and in the exudate of the anterior chamber diplococci were found in great quantities. In one of these, in which the process was allowed to continue, a panophthalmitis, with subsequent rupture, developed, followed by evacuation of the globe and cure. The author reproduced the original disease in two rabbits by injecting some of the material into the space of Tenon. Having excluded the lachrymal sac as the origin of the disease, he thinks that, the pneumococcus being frequently found in the conjunctival sac, it is possible that in this case the germ may have penetrated into the deeper parts of the eye through the bottom of the ulcer.

Stuffer, of Modena, ³⁰_{Jan., '95} observed a case of endocranial abscess following a retrobulbar abscess in a boy, 1½ years old, who had been sickly from birth. For two weeks before he was seen by the author he had been suffering from right exophthalmos. His temperature was 40.3° C. (104.5° F.); there was great prostration; strong, very rapid, and regular pulse, and occasional convulsive movements. The right eye protruded about two centimetres beyond its fellow and the regions surrounding it were swollen and discolored. Below the eyebrow there was a more projecting portion, which was yellowish, shining, and about the size of a walnut. The conjunctiva was deeply injected, especially toward the poles. With the ophthalmoscope the papilla was found to be uniformly reddened; the veins were congested and the arteries small. A large quantity of pus was evacuated by incision and the cavity was washed and drained. The bottom of the orbit appeared bare and roughened. After the operation the temperature rose to 41.2° C. (105.2° F.) and the convulsive movements became more frequent. Shortly after, a fluctuating mass appeared under the scalp of the frontoparietal region of the right side, which projected about four or five centimetres. This was incised, giving egress to a large quantity of sero-purulent and blood-fluid. The surface of the bone was found to be roughened, and a piece about one centimetre by two centimetres in size, found to be carious, was removed. The meninges below seemed hyperæmic and œdematous. Staphylococcus

pyogenes was the only bacterium found. After this procedure the general condition and that of the eye improved. Two years later there was no trace of the disease beyond the scar in the scalp. The author thinks that the staphylococci had penetrated beneath the cranium by natural or artificial channels and that a thrombosis of the venous system of the meninges had occurred in that region, favoring the development of a suppurative process.

Badal, of Bordeaux, ⁷⁰_{July 7, '95} has removed a cysticercus of the orbit, the parasite being attached to the roof by a fibrous pedicle. Valude, of Paris, ⁹⁹⁶_{Aug. 25, '95} believes that cystic orbital angiomas are best treated by means of electrolysis. A case of symmetrical lymphoma of the orbit, occurring in a female 63 years old, has been seen by Boerma, of Leipzig, ²⁰⁴_{B. 40, H. 4}. There were similar growths situated elsewhere throughout the body which the author thought were due to pseudoleukæmia, from which the patient suffered. Microscopical examination of the tumors showed that the connective tissue of which they were partly composed had undergone hyaline degeneration. Lagrange, of Bordeaux, ¹⁷¹_{May, '95} reports a case of malignant congenital tumor of the orbit which had developed during intra-uterine life, attaining about the size of a pear. It completely filled the distended orbit, and had no connection with the eye or the optic nerve. The growth had entered the cranium by the sphenoidal fissure, and was composed of two elements,—one of the conjunctival type and the other of the nervous, the latter being similar to that found at the beginning of the development of the brain and spinal cord. He believes that the tumor, therefore, deserves the name of glioma, though not resembling retinal gliomas, which are, in reality, pure sarcomata.

A case of recurrence of an hydatid cyst of the orbit, two years after aspiration, has come under the notice of Terson, of Toulouse, ¹⁷¹_{Feb., '95}. By a second operation the cyst-wall was removed and the sac was thoroughly curetted. There was no return after twenty-one months. The author believes that aspiration should be tried in all such cases before recourse is had to the more complicated procedures of excision. Galtier, of Nîmes, ¹⁷¹_{Mar., '95} has removed a small tumor of normal osseous tissue from between the conjunctiva and sclera in a child 6 years of age. The bone was situated upward and outward at the equator of the globe. There was a history of a fall six months before, which led the author to suspect that all so-called subconjunctival osteomas are fragments of fractured bone, especially as the only three cases previously reported have, like his own, occurred in the conjunctiva above the globe and in young subjects. Mitvalsky, of Prague, ²⁷⁴_{Oct., '94} gives the clinical history and microscopical examination of two cases of

osteomata of the frontal sinus and one of hyperostosis of the orbital walls, with coincident periosteal chondroma and myositis of the external rectus muscle. One of the cases of osteoma was associated with cysts of the mucous membrane, due to pressure caused by irritation. These cysts contained a mucoid fluid with, at times, the addition of pus. The tumors were of the eburnated variety and sprang from the inner table, and not from the diploë. He finds that these growths usually develop forward and downward, producing a corresponding exophthalmos, but says that they may also grow backward and give rise to cerebral instead of ocular symptoms. The author has succeeded in removing one osteoma, and without recurrence. In this case the frontal lobe was uncovered over a large area and the dura was torn from its adhesion to the tumor. In another case the orbital portion of the globe was excised after two hours' sawing. This was followed by a cessation in the growth of the tumor for three years. The third case was especially interesting on account of its extreme rarity and by reason of the necessity to distinguish it from syphilitic osteitis, etc., with the coincident chondrification of the muscle. Kalt, of Paris, ¹⁷¹_{May, '95} reports a case of fibrosarcoma of the orbit in a girl of 16 years. On removal of the growth it was found to have arisen in the bulbar portion of the capsule of Tenon. Later it extended into the orbital cavity, surrounded the external rectus muscle, and involved the superior rectus muscle and lachrymal gland.

An instance of forward and outward displacement of the globe, due to a hard tumor, probably of osseous or osteosarcomatous origin, on the inner wall of the orbit, is cited by Martin, of Bordeaux. ¹⁸⁸_{July 14, '95} The growth had extended into the corresponding nasal cavity.

Benson and Graves, of Dublin, ²_{Apr. 27, '95} have removed an orbital alveolar sarcoma without injury to the eye, in a man aged 55 years. The growth, which was hard and lobulated and about the size of a small hen's egg, appeared to start from the region of the lachrymal sac.

In a case of complete removal of the eyelids and contents of the orbit for a rapidly-growing sarcoma within the orbit, Lloyd-Owen, of Birmingham, ³²_{Jan., '95} has had an artificial eye constructed about which the lids may be modeled.

Diseases of the Lachrymal Apparatus.

Haltenhoff, of Geneva, ¹⁷¹_{May, '95} reports a case of traumatic prolapse of the lachrymal gland in a boy 2½ years old. The probable cause of the condition was a fall upon some sharp, broken stones, a fragment of which cut the upper lid while the eye was open.

It penetrated from below upward, across the suspensory ligament, and caused the gland to protrude from the wound. The gland was recognized and excised, the palpebral portion being left and the wound healing by first intention. There was no perceptible difference in the moistening of both eyes nor in the flow of tears, which would be in favor of de Wecker's theory that emotional lachrymation, found only in man, is a function solely of the palpebral glands, which are absent in the lower animals.

A case of symmetrical hypertrophy of both lachrymal glands, in a woman of 38 years, has been observed by Ripault,¹⁵² of Paris, Feb. 1, '96. Baquis, of Leghorn,³⁰ Oct., Nov., '94 cites a case of symmetrical tumor of the lachrymal gland of trachomatous origin, and from a study of the case he concludes that in trachoma a chronic adenitis of the lachrymal glands can be produced, the infection spreading from the fornix by means of secreting tubercles.

An instance of tuberculosis of the lachrymal glands has been noted by Salzer, of Heidelberg,²⁰⁴ B. 40, II. 5 in a 15-year-old girl. The tumor had been diagnosed as adenoma and had been extirpated as such, but the microscope revealed the true nature of the growth. The tubercles had involved the glandular epithelium. In a child complaining of epiphora, Lafite-Dupont, of Bordeaux,¹⁷¹ Apr., '96 found a congenital absence of both canaliculi in one eye and of the inferior one of the other. The mother of the child had epiphora from some imperfection of the lachrymal passages. The father had the same conditions, while a brother of the patient had a cyst of the lachrymal sac. Roy, of Atlanta,³⁴⁷ June, '96 has observed a case of bilateral congenital fistulae of the lachrymal sacs in a colored girl 14 years of age. An instance of congenital monolateral fistula of the lachrymal sac situated above and parallel to the inferior canaliculus is reported by Dunn of Richmond,²⁴⁹ Apr., '96 in which the secondary canal had no communication with the normal channel.

A case of obstinate lachrymal fistula, in an anæmic girl 11 years old, is detailed by Armaignac, of Bordeaux.¹⁷³ Apr., '96 After many months' treatment a cure was effected by curetting the sinus and uniting the freshened edges of the exterior opening by stitches. With this procedure periodical dilatation of the lachrymal canal was combined.

Story, of Dublin,⁷⁶ June, '96 insists upon the advantage of slitting the upper canaliculus in treating lachrymal obstruction, and states that, while he may at times have failed to obtain perfect patency of the nasal duct, he has invariably relieved the epiphora in cases in which he has succeeded in curing the stricture of the duct.

Lagrange, of Bordeaux,⁷⁰ Aug. 18, '96 cautions against the opinion that

treatment of strictures of the duct by electrolysis insures against relapse, as, in his experience, electrolytic cicatrices are as retractile as others. He employs the electrical method with a current of 4 to 6 milliampères for its alterative effect only. In probing he avoids the use of instruments of large calibre. In the treatment of lachrymal obstruction the experience of Snell, of Sheffield, ⁷⁶Apr., '96, with the use of large probes, as recommended by Theobald, has been that a large majority of cases are either cured or are greatly benefited.

Goodman and Ziegler, of Philadelphia, ²¹²⁹V.1, No.1 believe that, for the relief of obstruction of the lachrymo-nasal duct, rapid dilatation by immediately forcing a wide-lumen instrument in is by far the quickest and most reliable method. Vilas, of El Paso, ⁵⁹June, '96, succeeds in keeping the lachrymal duct open, in treating lachrymal obstruction and abscess of the sac, in the following manner: After slitting the canaliculus a small-sized cannula with a contained probe is passed through the canal. The probe is then withdrawn and a strand of silk-worm gut is passed down and brought out through the nose. The cannula is removed and a split shot of aluminium or lead is fastened to one end of the thread, which is then pulled up until its progress is arrested. A second shot is attached to the upper end, close to the punctum, and the suture is allowed to remain until the disease has been cured.

In the treatment of epiphora, Rochon-Duvigneaud, ³⁵Dec.15, '94 of Paris, points out the importance of determining the cause of the affection, which, he believes, is either (1) obstructive; (2) hypersecretive, as in tabes; or (3) reflex, as in nasal conditions. He believes that it will be impossible to effect a cure until these factors are allayed.

Galezowski, of Paris, ¹⁷³Apr., '96 has noted the prevalence in Persia of cases of obstruction of the lachrymal canal, with its resulting conditions of conjunctivitis, blepharitis, keratitis, etc., which he considers as the cause of three-fourths of the ocular affections in that country. Cataracts are of rare occurrence and syphilitic affections of the eye are almost unknown. The three conditions of especial interest seen were: (1) retinal endarteritis, with absolute blindness in both eyes, the result of pernicious intermittent fevers; (2) perineuritis of the optic nerve, of gouty origin, and (3) a variety of hæmorrhagic glaucoma.

Panas, of Paris, ³Jan.23, '96 observed a patient who had acute bilateral dacryoadenitis, appearing twenty-five days after an acute tonsillitis, which had left some peritonsillar, pharyngeal, and nasal inflammation.

A case of dacryocystitis, following slitting and probing of the

canaliculi, has been reported by Valude, of Paris.¹⁷¹ After this procedure there were ecchymosis and pain in the orbital ridges; seven days later failure of vision began. Two days after this exophthalmos developed, total blindness ensuing at the end of ten days. The ophthalmoscope revealed a red nerve, large veins, and small arteries. Atrophy of the optic nerve followed. The globe and the surrounding tissues gradually assumed their natural appearance. A fatal case of dacryocystitis is reported by Leplat.¹⁷³ Failing in his efforts to pass a No. 2 probe into the nose, the author injected a 3-per-cent. solution of acetate of alum into the canal, part of the solution reaching the pharynx. A few hours later a discolored spot appeared on the cheek, which was followed by much swelling. Symptoms of meningitis set in and death ensued in six days. The writer thinks that the wall of the sac or duct was ruptured, and that infection of the surrounding tissues then occurred, which spread to the meninges by means of the venous system, without involvement of the orbit.

Cuénod, of Paris,¹⁷¹ thinks that the pneumococcus, which is a normal occupant of the respiratory tract, can produce ocular trouble by infection through the lachrymal passages and also endogenetically, infecting the orbit and different membranes of the eye. In 6 cases of abscess of the lachrymal sac, Mazet, of Paris,¹⁰⁰ found the streptococcus in 5 instances, associated with the bacillus mesentericus vulgatus in 2 cases, and two non-pathogenic bacteria in 1 case. The bacterium coli commune was found to be the pathogenic organism in the sixth instance. In 4 cases of subacute abscess there were almost pure cultures of the staphylococcus in 3 instances; saprophytic organisms were present in 2. In the fourth case of subacute abscess a pyogenic bacillus not hitherto described was present. In a study of the bacteriology of the lachrymal apparatus, Terson and Cuénod, of Paris,⁴¹ call especial attention to the frequent presence of the pneumococcus of Talamon-Fränkel in suppurative dacryocystitis, as well as the pneumobacillus of Friedlander, associated with the streptococcus and without the streptococcus in suppurative cases. They found that the infection was usually from the nose, rarely from the conjunctiva, though the latter contained the pneumococcus. The exact importance to be attached to these cocci is still undetermined. After giving the chemistry and bactericidal properties of sodium fluoride, Duclos, of Bordeaux,²⁵ reports excellent results from its use, in 0.5-per-cent. solution, in eight cases of dacryocystitis. His method is to irrigate the sac and duct without dilatation, if possible. He claims that the substance stops all bacterial action in 1-per-cent. solution, and that it is totally unirritating in such strength.

Formeaux ²²⁰_{Sept. 28, '95} has reported a case of primary sarcoma of the lachrymal caruncle, invading the lids and conjunctiva and internal canthus, in a man 55 years old, which was cured after removal of the contents of the orbit.

Diseases of the Extra-ocular Muscles.

From a study of the relation of the function of accommodation to that of convergence, Stevens, of New York, ¹_{Feb. 16, '95} concludes that: 1. There is no essential connection between the function of convergence and that of accommodation; such connection as exists is incidental and the result of habitual association of the two functions. 2. The proportion of the cases of converging strabismus associated with hypermetropia, and of diverging strabismus associated with myopia, has been greatly exaggerated. 3. The cases of strabismus which are relieved by positive or negative spherical glasses are cases of hypermetropia,—that is, of a deviation of one visual line above the other or of a deviation of both eyes upward or downward,—and the relief obtained through such glasses is largely through the action of such glasses acting as vertical prisms. 4. His observations have led him to believe that excessive accommodation is not directly a causative influence in converging strabismus.

An exhaustive communication upon the function of the oblique muscles has been contributed by Savage, of Nashville. ¹⁰⁰⁷_{Apr., '95} As a proper method of correcting oblique astigmatism he advises primarily the correction of one-fourth of the astigmatism, this to be replaced in a few days by a correction of one-half of the astigmatism, and so on until the full correction is worn. This method gradually relieves the distortion of the images and transfers the strain from the inferior to the superior obliques.

Alling, of New Haven, ²⁴⁹_{July, '95} points out that, owing to the corresponding lateral fields of fixation at a finite distance being greater for one eye than for the other, there is an area in which binocular crossed diplopia may manifest itself, and also, from the difficulty at convergence in the upper field, crossed lateral diplopia may appear. No diplopia occurs in the lower field for near vision, but homonymous diplopia may show itself in this region at a distance, from the tendency to converge below. He also finds that in the lower lateral fields, owing to the intervention of the nose, diplopia cannot present itself; whereas in the upper lateral fields, from the difficulty with which a near object can be fixed, diplopia occurs that in many cases is unconquerable. He therefore considers it unnecessary to infer the presence of congenital paralysis of the superior rectus muscles in cases where this phenomenon shows itself.

From an examination of twenty-five non-asthenopic subjects under 40 years of age, made with the view of determining the relation between abduction and adduction, Risley, of Philadelphia, has found it to be as 1 to 3. ¹¹²
Jan., '95

A considerable experience with the parallax test for heterophoria (ANNUAL, issue of 1890) has convinced Duane, of New York, ²⁴⁸
Apr., '95 of its precision, accuracy, and utility.

Arnaud, of Marseilles, ¹⁰⁰
Dec. 25, '94 gives a method of rapidly discovering the faulty muscle in diplopia. It is based on the following points: 1. In lateral diplopia the images diverge when an abducting muscle is paralyzed and converge when a converging muscle is paralyzed. 2. In inferior vertical diplopia the lower image is seen by the eye of which a rotator downward is paralyzed, and, conversely, in superior vertical diplopia the higher image is seen by the eye of which a rotator upward is paralyzed.

In a case of paralysis of accommodation observed by Macbride, of New York, ⁷⁷⁶
Apr., '95 the pupils contracted during the act of convergence, suggesting to O'Connor, of the same city, that the pupillary contraction which takes place in near vision is more intimately associated with convergence than with accommodation.

Retraction of the eyes in a case of abolished adduction and abduction, in a woman 20 years of age, has been seen by Rais, of Providence. ⁹
May 4, '95 During efforts at convergence the eyeballs were seen to move alternately backward for about two or three millimetres until one eye alone remained in a stable position. At the same time the lids manifested movements of oscillation. That the lid-movements, however, had nothing to do with the retraction of the globe was proven by the fact that the retraction occurred when the lids were separated from the globe by an elevator. Roy, of Atlanta, ¹⁰¹⁸
Oct., '94 records two cases of paralysis of the external rectus muscle. The first case occurred in a man 42 years of age, and was apparently malarial in origin. The second instance was seen in a boy 7 years of age, and was of interest owing to the rapid improvement which resulted from gymnastic exercise executed by grasping the overlying conjunctiva with the fixation-forceps and rotating the globe to the right and to the left.

Four cases of paralysis of the fourth nerve have been collected by Chauvel, of Algiers. ¹⁷³
July, '95 In only one was the visual acuity markedly reduced (to $\frac{1}{8}$), as a result of beginning optic neuritis, which was probably caused by cerebral tumor of tubercular nature. Of the 4 cases, 2 were emmetropes and 2 were myopes. The causes assigned were traumatism, syphilis, and cold. Two cases responded to mixed treatment, and a third, which was due to cold, yielded to frictions and electricity.

Koenig, of Paris, ^{Aug. 19, '96} reports a congenital case of partial oculomotor paralysis in an idiotic child whose parents were apparently healthy and denied ever having syphilis. There was a spasmodic condition of all the muscles, as well as constant choreic movements of the arms, shoulders, and face. The eyes were divergent, but could be brought to the median line. Movements above and below were not possible. No ptosis was present and the irides responded to light. These conditions were associated with a microcephalic head, which was less developed on the right side. The ophthalmoscope showed a circumscribed choroiditis. The author believes that the oculomotor paresis was due to partial external paralysis of the third nerve, except the branch supplying the levator palpebræ. He further thinks that there was a nuclear lesion, due to chronic inflammation and lack of development of the fœtus, the cause of which was unknown. A case of marked general limitation of movement of the globe, following contusion, is recorded by Vignes, of Paris. ¹⁷³_{Oct., '94} Exercise of all the muscles in succession, by means of the stereoscope, brought about a complete cure.

A case of traumatic paralysis of the external rectus, following contusion of the mastoid process on the same side, has been reported by Armaignac, of Paris. ¹⁷¹_{June, '95} The patient, a boy of 15 years, had a fall while running, striking his mastoid process against the tibia of a comrade. He presented no symptoms beyond a marked convergent squint, which was noticed immediately after the accident. He had a marked diplopia for distance, which was less for near. Treatment by localized faradization of the paralyzed muscle was attended with marked improvement, though at the time of reporting there remained some homonymous diplopia. From the absence of involvement of other nerves and of general symptoms, the author believes the lesion to have been a small hæmorrhage in the cavernous sinus or, possibly, merely a concussion of the nerve. Friedenwald, of Baltimore, ²⁴⁹_{Oct., '94} has collated the cases of traumatic paralysis of the abducens nerve occurring since the publication of the article of Purtscher, and adds a case of bilateral paralysis of the sixth nerve, observed by himself in a man, 40 years of age, who had received head-injuries which had caused unconsciousness and hæmorrhage from both ears and from the nose. The left pupil was somewhat larger than the right. On the fifth day paralysis of the left externus presented, and about the end of the third week the right externus became similarly affected. There was paralysis of the sensory portion of the trigeminus. The drum-membrane and the osseous canals of both ears were fractured. There were no changes in the

fundus oculi and the visual fields were practically normal. A case of associated peripheral paralysis of the third and seventh with implication of the fifth cranial nerves on the right side has been observed by O'Connor, of New York. ⁷⁷⁶_{July, '95} All the extrinsic muscles supplied by the third nerve were involved, but the pupil was apparently strongly contracted. Owing to the existence of a leucoma of the cornea this could not, however, be stated absolutely. At first the ptosis was incomplete; so that the uncommon condition of inability to close, as well as to open, the eye was present. The patient was a man 32 years of age.

Bitzos, of Constantinople, ²³²_{Aug. 31, '95} reports a case of paralysis of the extrinsic muscles of the eye, involving the obliques and superior and inferior recti, with paresis of the internal and external recti of the right eye, in a boy 17 years of age. The author attributes the condition to some brain trouble which existed fifteen years previously.

Brunner, of Cleveland, ²³³_{May 28, '95} has observed an instance of paralysis of the superior rectus muscle in a woman, 28 years of age, who, five or six years previously, had what was probably an embolism of one of the cerebral arteries, followed by right-sided paresis and impairment of vision and hearing. Examination showed limitation of the upward movement of the eye to 5 degrees, the excursion being accompanied by oscillatory movements of the globe. There was an esophoria of 2 degrees for distance and an exophoria of 6 degrees for near. The refraction-error was one of compound hypermetropic astigmatism. Both fundi showed evidence of past retinitis. The author is inclined to think that the case is similar in type to those reported by Duane, in that the paralysis is congenital in origin, but considers that it is due to central deficiency rather than to malformation or arrest of development of the muscles.

A case of total paralysis of elevation, limitation of depression to 20 degrees, and paralysis of convergence, in a woman, 73 years old, who previously had had two attacks of incomplete right hemiplegia, has been observed by Sauvinau, of Paris. ¹⁷³_{Oct., '94} The other intra- and extra- ocular muscles had escaped. Comparing it with other cases and insisting on the great improbability that such lesions are due to selective nuclear processes, the author has recourse to the hypothesis of a supra-nuclear association centre, the evidence of previous autopsies showing that this centre is probably situated in the quadrigeminal body. Alt, of St. Louis, ³⁴⁷_{June, '95} noted paralysis of the oculo-motor nerve, occurring just previous to an attack of pneumonia, in a woman aged 36 years. The paralysis was gradually recovered from during convalescence.

A case of bilateral complete external ophthalmoplegia, in a girl 2 years of age, is recorded by Jack, of Boston.⁹⁹
July 18, '95 In the left eye there was a patch of atrophic choroiditis. At the onset of the eye-symptoms there was a period of restlessness and irritability.

In a review of the literature of lesions of the trigeminus during the course of palsies of the oculo-motor nerve, Benoit,⁹²
July, '95 states that he has found them to be frequently associated, and that the etiology and pathology of disturbances of the fifth nerve are quite analogous to those of its neighbors. Three instances of congenital, bilateral ptosis, associated with a partial ophthalmoplegia, in which the vertical ocular movements were conserved, while the horizontal movements were much limited, have been recorded by Dujardin, of Lille.²²⁰
Dec. 8, '94 On fixing to the right eye the left eye deviated strongly, while the left eye converged strongly when the eyes were deviated to the left, producing divergent strabismus in the first and convergent strabismus in the second case. The phenomenon occurred in three sisters. In a case of nuclear ophthalmoplegia observed by Hubbell, of Buffalo,¹⁷⁰
Aug., '95 in an otherwise healthy man 40 years of age, all the extrinsic muscles of the eye were almost completely paralyzed, but the intrinsic ones were only slightly affected. There was partial facial paralysis. The optic nerve showed a low grade of inflammation. Central vision was somewhat reduced, but the fields were normal. Under the use of potassium iodide visual acuity increased, but the paralysis remained unchanged.

Vignes, of Paris,¹⁷¹
Oct., '94 obtained satisfactory movements, in an eye which had been the seat of an external ophthalmoplegia, by means of stereoscopic exercises.

As a result of experimental study, Russell¹⁷⁸
v.17, No. 1, '94 concludes that displacement of the eye other than lateral, in a case presenting other evidence of cerebellar disease, points to implication of the middle lobe of this organ; but that when indications of increased intra-cranial tension, with inward displacement of one or both eyes, is present, the possibility of this being due to pressure on the sixth nerve must not be lost sight of in attempting to arrive at a correct diagnosis. A further possibility is the secondary implication of the nuclei of ocular nerves by disease beginning in the cerebellum, or the secondary implication of the cerebellum by disease beginning in the nuclei of ocular nerves,—considerations which make the diagnostic problem a very complex one. As the middle lobe of the cerebellum, however, is that most likely to be affected in such cases, the original statement with regard to ocular displacements met with in connection with this part of the organ, as opposed to the lateral lobes, is not materially affected. In 60

normal individuals, Bach, of Würzburg, ²⁵⁴_{Dec., '94} was able to produce nystagmus artificially in all but 5, while among 85 deaf-and-dumb individuals he succeeded in exciting this movement in only 45 instances. From this he deduces that nystagmus is dependent upon associated movements of the head, and that it has a connection with the lymph in the labyrinth of the ear.

Audeoud, of Geneva, ¹⁹⁷_{Jan. 20, '95} reports 7 cases of nystagmus, occurring in three generations of one family, in which other forms of nervous troubles were frequent. Out of 5, 3 showed a normal fundus oculi, 1 a partial atrophy of both papillæ, and 1 nearly normal papillæ. In 3 of the cases visual acuity was below normal, though the defect could not be accounted for by ocular lesions. He thinks that the central nervous system plays an important part in these cases, and agrees with du Saulle in believing the nystagmus to be a stigma, of pathological heredity, it being generally found only in those who come of families that are mentally defective, as his own cases would show.

O'Connor, of Detroit, ⁶¹_{June 29, '95} embodies his views in regard to strabismus in the following conclusions: 1. Strabismus is always a symptom of some morbid or congenital defect. 2. Success in its relief has increased in direct proportion to our knowledge of these conditions and defects. 3. Strabismus due to opacities of the refracting media or to congenital amblyopia can only be treated by operations, and solely for cosmetic effect. 4. Strabismus due to the combined action of hyperopia and normal recti is treated by tenotomy or advancement, atropine, mydriasis, suitable glasses, and gymnastic or innervation exercises. 5. Binocular vision is to be sought for in all cases other than those due to opacities of the refracting media, congenital amblyopia, or organic disease of the retina or optic nerve. With sufficient perseverance it is attainable in a fair proportion of cases. 6. Recent studies of heterophorias afford substantial aid in the better management of squint by the new standards of both operative and gymnastic work, by the more convenient and reliable instruments for examination, and finer ones for operation. 7. There yet remain a number of cases of squint not explicable by our present knowledge or amenable to treatment by accepted methods.

From examinations of French soldiers, Chauvel, of Algiers, has collected ¹⁷³_{Feb., Mar., '95} a series of 224 cases of convergent strabismus and 101 cases of divergent strabismus. The right eye was most often affected in the convergent and the left in the divergent form. The greater number of cases in both forms occurred between the ages of 20 and 25 years (age of active service). In both the visual acuity was reduced to less than one-sixth in two-thirds of

the cases, and was improved by correction of refractive errors in only about 25 per cent. For convergent strabismus the state of refraction was found to be: emmetropes, 30.9 per cent.; myopes, 5.5 per cent., and hypermetropes, 63.6 per cent. In the majority of cases the ametropia was from 1 to 3 dioptries. For divergent strabismus the statistics showed: emmetropes, 40.1 per cent.; myopes, 19.8 per cent., and hypermetropes 40.1 per cent. Here, in the majority of cases, the ametropia was less than 4 dioptries. The myopes are thus shown to be in the minority in both forms. Astigmatism was present in about 50 per cent. of the cases of convergent strabismus, and of these 90 per cent. were less than 4 dioptries, showing that here the amblyopia is not markedly dependent on the state of refraction. In the divergent form two-thirds were astigmatic and high degrees of astigmatism were much more common than in convergent strabismus,—68 per cent. above 2 dioptries, as against 38 per cent. Here the astigmatism will account in part for the amblyopia. The visual fields were reduced in both, but more so in the converging eye. Heredity was found to be only a slight factor in the production of strabismus. Other causes assigned in a few cases were: convulsions in infancy, typhoid fever, ophthalmia, meningitis, and traumatism. Ordinarily there was no recollection of sickness coincident with the appearance of the ocular deviation. The condition almost invariably began before the tenth year and usually before the sixth year. Complications, while rare in convergent strabismus, were very frequent in the divergent variety, and included diplopia, nystagmus, corneal opacities, keratoconus, opacities of the lens, hyalitis, chronic iritis, staphyloma, general atrophy of the choroid, and macular choroiditis. Divergent strabismus is thus shown to be dependent upon amblyopia, and the author thinks that this agrees with the clinical fact that loss of function of one of the eyes is followed by this deformity. He does not advise tenotomy in the treatment of strabismus among adults, as he has rarely seen satisfactory results in either form after its performance.

Valk, of New York, ⁴⁶²_{July, '96} divides concomitant convergent squint into two classes: (1) squint with congenital amblyopia and (2) squint from relative hypermetropia with possibly psychical suppression of the visual image in one eye from non-use. In the second class, if correction of the hypermetropia fail, he advises tenotomy, first on the squinting eye and, later, if necessary, on the fellow-eye. In the first class he shortens the externus of the squinting eye by taking a tuck in the muscle.

Homonymous diplopia, in a case of divergent strabismus occurring in a girl of 17 years, has been seen by Harvey, ²⁴⁹_{Apr., '96} of

Providence. In the right eye there was a low hypermetropia and in the left a low hypermetropic astigmatism. Only after correction of the refractive anomaly could diplopia be induced, this at first being homonymous in variety and of 3 degrees and then of 8 degrees. Notwithstanding that a 12-degree prism, base in, was required to maintain equilibrium, as evoked by the cover-test, correction of 4 degrees of the muscular error gave marked relief, but the homonymous diplopia increased to 12 degrees.

In a preliminary article, Stevens, of New York, ¹⁷¹_{Apr., '96} calls attention to alternative vertical strabismus and symmetrical vertical deviations, which are less pronounced than lateral strabismus. He points out that a deviation upward of the visual line of each eye, when its fellow fixes, causes anatrophia, and a deviation downward of the visual line of each eye, when its fellow fixes, kataropia. The lateral deviations, which are very important and frequent, are due solely to unequal or hypertension in the superior or inferior recti. In such cases tenotomies or other operative procedures should be directed to the inferior or superior muscles, as the case may be, and not to the lateral muscles.

Nine cases of insufficiency of the internal rectus have been noted by Chauvel, of Algiers. ¹⁷³_{Apr., '95} Of the 18 eyes, 10 were emmetropic, 2 hypermetropic of 0.50 dioptré, and 6 were myopic from 1.50 to 7.50 dioptries. Visual acuteness was good when corrected by appropriate glasses. Two presented regular astigmatism. One case of marked posterior staphyloma was found. As a causal element, a probable ataxia existed in 3 cases; 1 case was cachectic; 1 had a rebellious facial neuralgia. In 3 there were a dacryocystitis and ophthalmia.

Schmidt-Rimpler, of Göttingen, ⁶⁹_{Nov. 1, '94} points out that binocular vision in strabismus is the rule, diplopia not being noticed because the attention of the observer is directed to the macular picture, making the other one secondary and only noticed when special attention is called to it. After operation the weaker eye should be exercised, so that binocular vision may be obtained from both maculae, the force of will helping to prevent diplopia, which may be caused by deficient nerve-force, though the opposing muscles may differ but slightly in relative strength.

In regard to the treatment of strabismus, Valude, of Paris, concludes ¹⁷_{Jan. 26, '96} as follows: In divergent strabismus tenotomy of the external rectus and muscular advancement of the internal rectus of the deviated eye should be performed, while in periodical convergent strabismus correction of the refractive error and general treatment usually suffice. In alternating convergent strabismus he first corrects refraction-errors and follows this by a limited

tenotomy of an internal rectus. Some days later, if necessary, he performs a similar tenotomy upon the other. In fixed convergent strabismus he prefers tenotomy of the internal rectus of the deviated eye and advancement of the external rectus of the same eye, the advancement being capsular in moderate strabismus and muscular in marked cases. In a preliminary report upon six hundred and twelve cases of convergent squint with special reference to the final results of operation, Bull, of New York, ^{AUG 24, '96} concludes that: 1. If the squint is in one eye and of the alternating variety, there is usually very little amblyopia in either eye and but little difference in the refractive error of the two eyes. In the majority of these cases free tenotomy of the internal rectus of the eye which usually squints, with immediate full correction of the refractive error, will give, as a final result, either apparent parallelism or such a slight degree of convergence as is not noticeable under the glasses. 2. If the squint is always in the same eye, there is almost always a decided difference in the refraction of the two eyes and a decided amblyopia in the squinting eye. In these cases, if there is no loss of power in the external rectus, the best results are gained by tenotomy of the internal rectus and advancement of the external rectus of the squinting eye and subsequent full correction by glasses. 3. If there is marked amblyopia in the squinting eye and some loss of power in the external rectus of the same eye, the best operation will be found to be tenotomy of the internal rectus and advancement of the external rectus of the squinting eye, and, at a varying period later, tenotomy of the internal rectus of the other eye. The operation of simultaneous tenotomy of the internal rectus of both eyes and advancement of the external rectus of the squinting eye is not desirable in these cases, as it too often leads to permanent divergence. 4. If, however, the squinting eye is markedly amblyopic and the external rectus of this eye is entirely paralyzed, the best results are gained by a simultaneous tenotomy of the internal rectus of both eyes and advancement of the external rectus of the squinting eye. 5. In the emmetropic cases, fifteen in number, the best results were gained by tenotomy of the internal rectus of the squinting eye, followed at a varying period by tenotomy of the internal rectus of the other eye. The reason for this is not as yet apparent. 6. There will always be a number of cases, by no means inconsiderable, in which it will be impossible to decide in advance what methods of operating will be likely to give the best results, and in which what we do will be more or less a matter of guess-work. 7. Any complication which interferes with the visual acuity of a squinting eye—such as corneal maculæ, striæ in the lens, or extensive choroidal atrophy—must be regarded

as pointing to the necessity of more extensive operative interference than simple tenotomy, even when no great refractive difference exists between the eyes and where no paresis of the external rectus is present.

Schweigger, of Berlin,²⁵⁴_{Nov., '94} points out that, in order to judge of the result of tenotomy, we should choose those cases of strabismus in which there is diplopia. This permits of obtaining the exact amount of deviation in prism-dioptres. The author performs tenotomy after Arlt's method and frequently increases the effect of the operation by dividing the fibres which run to the caruncle. He reports 25 cases of simple tenotomy of the rectus internus. These comprise 2 emmetropes, 3 hypermetropes, 13 myopes, 1 case of hypermetropic astigmatism, and 6 anisometropes. In only 3 of these cases did the operation suffice to cure the strabismus, while in 7 cases there was absolutely no effect from the operation. He believes that the theory of the retraction of the muscular insertion is not sufficient to account for the effect of a tenotomy. When diplopia does not exist the author measures the deviation by the method of von Graefe. The majority of these cases were instances of periodical squint, in which a single tenotomy usually sufficed for relief. When both interni are divided a result of from 15 to 24 degrees is usually attained. If but a slight effect is gained by a double operation, the externi will be found to be very feeble and demand advancement. The immediate effect of tenotomy of the externus was found to be very variable,—between 0 and 25 degrees. The permanent result attained varied from 0 to 9 degrees. The operation is best adapted to cases of periodical divergent strabismus. If this has attained eight millimetres a double tenotomy is indicated; if it is of higher degree an advancement should be done. In the treatment of insufficiency of the interni, in emmetropic eyes, when there is defective innervation of convergence, the author employs prisms with their bases in. If there is divergent strabismus, he operates. He has found that simple advancement of the interni rarely succeeds. The author gives the steps of the advancement operation previously described by him, and states that it is impossible to judge what the final result will be until four weeks after the procedure. In regard to the theory of the causation of strabismus, in every muscle that performs its functions, its innervation and elastic tension must be considered, for these are the two factors which have the most to do in the production of the strabismic condition.

The subcutaneous injection of bichloride of mercury in so-called rheumatic paralysis of the external rectus is advocated by Martin, of Bordeaux.¹⁸⁸_{Jan. 27, '95} He employs daily doses of 1 cubic

centimetre of a 1-per-cent. solution, injected into the buttock or into the temple. Of 4 cases thus treated, 2 were cured in nine days, 1 in eighteen days, and 1 in forty days. Fergus, of Glasgow, ⁷⁶ June, '95 has described an operation for advancement which differs from the method employed by Swanzy in that two horizontal incisions are made parallel with the borders of the muscle, including the conjunctiva in the muscle-sutures. He thus avoids the necessity of laying bare the muscle. Bourgeois, of Reims, ¹⁷³ Aug., '95 insists upon the advantages of advancing the external rectus, in operations for strabismus, and reports successful results in 100 cases. His first step is tenotomy of the internal rectus. On the following day, if the result is not sufficient, he advances the external rectus. Sometimes tenotomy of the internal rectus of the opposite side is necessary. After the operation, prisms may be used to exercise the muscles. In 17 cases visual acuity was restored immediately following the operation, and 72 others were relieved by proper exercises. He especially condemns delay of the operation in adults. In the treatment of strabismus, Vignes, of Paris, ¹¹⁵³ Sept. 7, '95 prefers capsulo-muscular advancement to tenotomy. He performs this operation in young children without hesitation, never having had any bad results. It is indicated to restore binocular vision and to avoid amblyopia exanopsia.

Hughes ²⁸⁵ Sept. 20, '94 believes that the failure to cure more cases of convergent strabismus by glasses results from the neglect of the surgeon to order total correction. He tabulates 21 cases which were recently so treated, of which 12 were cured, 2 improved, and 1 was too recent to determine the result. Stevens, ¹⁷¹ Nov., '94 of New York, says that every modification of a lateral muscle, whether by tenotomy or by advancement, affecting to any degree the rotation of an eye, ought always to be accompanied by an exactly equivalent modification of the corresponding muscle of its fellow.

Ripault, of Paris, ¹⁵² Feb. 1, '95 has removed a small hydatid cyst from under the tendon of the left internal rectus.

Diseases of the Lids.

Israel ⁴ July 15, '95 has found that congenital tumors of the upper lids and of the temporal regions are usually seen in neurotic individuals and families, and are frequently accompanied by facial paresis, lack of development, the presence of nævi and other abnormalities. A case of binocular congenital ptosis and immobility of the globe has been reported by Ahlstrom, of Gottenburg, ²¹⁷ v. 16, '94 who attributes the condition to a lack of development of the muscular system which regulates these movements. M. P. Jacobi, of New York, ⁵¹ Jan., '95 has seen a case of congenital ptosis in a baby. The condition, which

was unilateral and not associated with paralysis of any other muscles, was complete at birth, but became partial.

An instance of bilateral congenital ankyloblepharon in twins has been seen by Hall, of Bristol.⁹⁹ In both children the lids of the right eye were attached by two narrow bands, while in the left eye the union was affected by but one band. The children's father had had the same anomaly. Emery, of London,³² records a case of lymphangiectasis of the eyelids and conjunctiva in a boy 12 years of age. The condition had made its appearance when he was 1 year old, and a period of a week had intervened between the affection of the two sides. The eyelids and surrounding tissues beyond the orbital margins were thickened and puffy, the condition extending on to the nose, in consequence of which the canthi were pushed out, giving the appearance of epicanthus. The skin was apparently healthy. At first there was no pitting, but later the skin became soft and somewhat pitted. There was slight blepharitis and nasal catarrh. The entire ocular conjunctiva in each eye was covered by a close net-work of greatly dilated and very tortuous lymph-vessels with transparent, colorless contents. The existence of a similar condition of the palpebral conjunctiva was indicated by a small, transparent, lobular tumor close inside the upper punctum, which, upon microscopical examination, proved to be formed of dilated lymph-vessels similar to those seen on the ocular conjunctiva. The conditions were absolutely symmetrical. All treatment was unavailing.

Twenty cases of pediculi ciliaris in 20,319 clinical cases, all occurring in white persons, have been reported by Schwenk, of Philadelphia.²¹²⁹ Three cases of phthiriasis of the eyelids, due to the *Pediculus pubis*, have been seen by Baudouin,⁷³ who thinks that the condition is not a rare one, and would be found more frequently were the cases of ciliary blepharitis in children more carefully examined. Mibelli, of Parma,³⁰ has made some clinical observations on blepharo-ciliary trichophytosis, and reports two cases of blepharitis caused by the *Trichophyton tonsurans*. The first case was a boy of 16 years, in whom the disease first appeared on the face, showing a well-marked case of trichophytosis. The disease had previously appeared in three other members of the family, who had evidently contracted it from cattle. The eyebrows were unaffected; the upper eyelids were somewhat wrinkled and presented a desquamation like that of pityriasis. They were red and swollen near the margin and the cilia were collected into small groups, being held together by dry, scaly crusts. Upon removing these crusts the cilia were found to be fewer and shorter than normal. The presence of a parasite was ascertained on ex-

tracting some of the hairs, it being in the form of very numerous spores situated only inside the cortex. The second case was in a man of 26 years, who, while suffering from trichophytosis on the left cheek, was affected by an extension of the same disease to the left eyelid. In this case, also, the cilia on the middle third of the lid had undergone alteration. Some were slender, straight, and short; others were twisted and deviated laterally, while the broken-off cilia could also be recognized, all being agglutinated by crusts and scales. Upon microscopical examination of one of the extracted hairs it was found to be strongly infiltrated with the trichophyton, in the form of chains of spores and a few filaments, which invaded the whole of the cortex, as well as the sheath of the root. An ointment of sulphur and salicylic acid was employed in the first case and a lotion of bichloride (1 to 5000) was used in the second, but in neither of them was there any improvement until epilation had been resorted to, after which a complete cure was effected. From four cases which the author has collected he deduces that the disease can develop in children as well as in adults, and that it affects one or both eyes, and the lower as well as the upper lid. In cases where the parasite attacks such regions as the eyelids, which are ordinarily able to resist its invasion, its greater virulence may be ascribed, in part, to its coming from the lower animals.

Valude, of Paris, ¹⁴_{July 21, '95} calls attention to the essential distinction between ordinary hordeolum and so-called internal hordeolum, as he considers the latter to be a subacute or chronic affection, situated totally within the cilia, affecting the ducts and glands of Meibomius and requiring incision and scraping to cure it. He suggests that *tarsal canaliculitis* would be a proper name for this affection.

An instance of unilateral palpebral œdema, occurring in a woman 25 years old, as an initial symptom of a general multiform exudative erythema, is cited by Bourgon, of Paris. ¹⁷¹_{Nov., '94} The application of a compress bandage and the internal administration of salicylate of soda were followed by a subsidence of the symptoms.

Snell, of Sheffield, ⁷⁶_{June, '95} records nine cases of chancre of the eyelids and conjunctiva. In all the preauricular glands were indurated and in some instances the submaxillary were involved.

Braquehay and Sourdille ⁷_{Nov. 21, '94} have made an histological study of a hard tumor of the upper lid, which proved to be a calcified squamous epithelioma. A case of fibroma of the eyelids in a man, 35 years of age, the subject of multiple fibromata, was seen by Goode. ¹⁰¹⁸_{Jan., '95} The growth, which had been slowly progressing

for twenty-five years, was diffuse and involved both lids. The upper lid was affected to the greater extent, overhanging the lower and extending to the inferior orbital margin. The tumor was successfully removed.

Fromaget and Cabannes, of Bordeaux, ¹⁷¹_{Apr., '95} report a case of melanotic sarcoma of the upper lid, followed by two recurrences after removal. The primary tumor followed a contusion of the lid with ecchymosis. In wounds of the lid, Gayet, of Lyons, ¹⁷¹_{Oct., '94} emphasizes the necessity of carefully suturing the different injured components.

The following practical points in anæsthesia for plastic operations about the eye are given by Zimmerman, of Philadelphia ¹⁰⁰⁷_{July, '95}: 1. Plastic surgery about the eye requires complete and prolonged anæsthesia with the minimum risk to the patient, and which can be induced without impairing the life of the tissues or infecting the wounds. 2. Ether, among general anæsthetics, best meets these demands. The method of administration should be simple, cleanly, and calculated to avoid encroaching upon the field of operation. 3. Cocaine is the only suitable local anæsthetic. For the conjunctiva it may be applied to the surface in 2- to 4-per-cent. solutions. When the skin is involved, subcutaneous injection becomes necessary. The punctures should be few and the dose not exceed $2\frac{1}{2}$ grains (0.162 gramme).

After various plastic operations had failed, in a case of symblepharon following a lime-burn, Chambers, of Jersey City, ⁵⁹_{Apr. 20, '96} secured a good result from a pedicle-graft obtained from the temple and sewed to the ball. The pedicle remained between the lids for four days without giving annoyance, when it was severed. Following the use of cocaine, an eruption simulating the rash of typhus fever appeared and the patient became maniacal, necessitating restraint for three days. Gasparini, of Siena, ³⁰_{Oct., Nov., '94} reports a case of successful skin-grafting for symblepharon which had been caused by the removal of an epithelioma. The growth had involved the caruncle and the internal third of the lids and ocular conjunctiva. After the globe was freed and the growth excised, there was a raw surface which extended from the inner third of the eyelids to the root of the nose. A piece of skin, one and a half times as large as the surface to be covered, was taken from the inner side of the arm and sutured into place by eight stitches. To form the *cul-de-sac* two small pieces of sterilized drainage-tube were introduced and two stitches passed around them. The central portion held, but the remainder underwent "dry gangrene." A second operation was successfully performed, no attempt being made to form a *cul-de-sac*.

Oliver, of Philadelphia, ²¹²⁹_{v.1, No.1} describes the operative procedures pursued for the relief of the ocular conditions produced by a traumatic symblepharon. Two large false attachments, which were marked to the temporal side of the globe, were so broad and short that the palpebral fissure was so distorted and the eye so dragged up and out beneath the upper lid that the cornea was almost invisible to ordinary inspection. After the bands had been sufficiently freed, inverted, and stitched into position, as in Arlt's operation, two large flaps of conjunctival tissue were dissected loose enough to allow them to be stitched over the exposed scleral area. To get a full and loose covering it was found necessary to pass so far above and below the cornea, to the nasal side of the globe, that when the free borders of the flap were united the cornea was so covered with the conjunctival tissue that only the central and inner thirds of the membrane could be seen. The case is of interest in showing the perfect freedom in which free and extensive incisions can be made into the conjunctival membrane in order to secure sufficiently broad and loose flaps to entirely cover raw and open surfaces so as to prevent undesired union of cicatricial tissues. It also illustrates the importance of carefully performing radical measures and the necessity of allowing sufficient interval to take place between the various procedures and long enough time to elapse before any final report of the result is given.

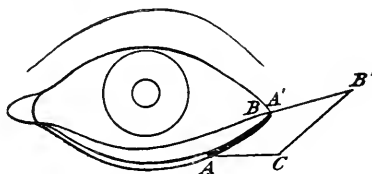
Kuhn ³¹_{Dec.5, '94} states that he has always obtained a perfect cure in entropium by canterization of the lid, in a line parallel with the margin and to the depth of the cartilage. In ectropion he has had the same good results by applying the same procedure to the conjunctival surface.

Knapp, of New York, ¹⁰⁰⁷_{July, '95} advises the transplantation of a strip of skin into the intermarginal space of the lids for the correction of severe forms of entropium and trichiasis.

Keyser, of Philadelphia, ²¹²⁹_{v.1, No.1} gives the method pursued in several blepharoplastic operations. He has found that cicatricial tissue can be used for flaps by having the surface rubbed and massaged with neat's foot oil for months before the operation. The following noteworthy observations have been made in the author's cases of Thiersch's operation: 1. The necessity of thorough cleanliness and antiseptic procedure throughout. 2. The perfect glazing of the wound before the graft is laid on. When in proper condition, the graft adheres at once,—that is, it sticks to the tissue; it really acts as if there were suction. 3. The best grafts, and those which adhered most promptly, were the thinnest that could be shaved. 4. The grafts soon after adherence swelled up, or rather thickened, and filled in the line of the skin in its normal position,

not leaving a hollow, or cupped, condition. 5. All the grafts shrank nearly one-half; so that it was necessary to repeat each operation with a second graft before the edges of the lids remained in their proper line. 6. Care must be taken to keep the tears from running down over and under the graft. This is readily accomplished by laying pledgets of absorbent cotton along the inner and outer canthi, under the oiled-silk or rubber covering. 7. The oiled-silk or rubber covering must not be kept on longer than a day or two, otherwise it may cause maceration and sloughing of the graft. After the second or third day dry dressings are the best. 8. Individual experience has shown that a graft adheres perfectly well on cicatricial tissue.

In employing Thiersch's epidermal grafts, Hotz,¹⁰⁰⁷_{July, '96} of Chicago, directs that the graft be transferred directly from the razor to the surface. He considers it important that the operated lid be fastened by ligatures,—the upper lid to the cheek and the lower to the forehead. Both eyes are bandaged until the fourth or fifth



OPERATION FOR ECTROPIUM. (OLIVER.)
Wills Eye-Hospital Reports.

day, and the ligatures and bandage are removed from the operated eye at the end of a week.

Oliver, of Philadelphia,²¹²⁹_{v.1, No.1} has remedied an ectropium by a modified Diffenbach operation. A lozenge-shaped area was removed from the skin at the outer commissure and, after division of the canthus, the inferior and superior edges of the denuded surface were brought together. The plan of operation is shown in the accompanying cut. A is stitched to A' and A to B'.

In order to avoid the inconvenience occasioned by passing three sutures in the operation of canthoplasty as suggested by Czermak, Heddaeues, of Ivan,³⁵³_{Nov., '94} has modified this procedure by removing the forceps and then making the incision immediately after the suture has been passed through the thickness of the lid.

Oliver, of Philadelphia,²¹²⁹_{v.1, No.1} gives a detailed description of the method of operation successfully employed for the removal of an epithelioma involving both lids at the outer commissure. The details of the method of operation can be understood by a study

of Fig. 1. The growth included in the large triangular flap, *A*, which was so shaped at the outer angle of the eye as to include the entire outer commissure, was excised. The nasal border of the area, *A*, was dissected sufficiently loose as to allow it some freedom and pliability. The flap *B* was then shaped, undermined, and slid over into the position of the area *A* and fastened by a series of superficially-placed sutures—*a a'*, *b b'*, *c c'*, *d d'*, and *e e'*—and a row of lateral ones along the superior border of the flap. In order to prevent the flap *B* from having a raw edge at its outer portion and to prevent irregular cicatrization near the epitheliomatous area, a second large flap was shaped at *C*. This was carried directly up to the temporal artery and given a broad base below by carrying the outer incision to the ramus of

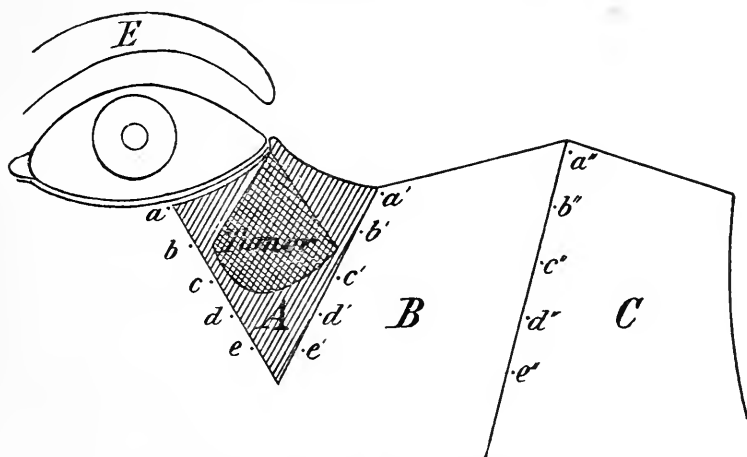


FIG. 1.—OPERATION FOR EPITHELIOMA INVOLVING BOTH LIDS. (OLIVER.)

Wills Eye-Hospital Reports.

the jaw. After dissecting the tissues beneath the base of the flap and the adjacent skin around the angle of the jaw, this flap was slid up and over and fastened—by a series of very superficial sutures (*a' a''*, *b' b''*, *c' c''*, *d' d''*, and *e' e''*) and a row of lateral ones running along the upper border of the flap from *a'* to *a''*—into the position occupied by the flap *B*. The lower portion of the flap *C* was lifted up and fastened in position by three deep sutures, thus leaving but a small, triangular, granulating area just in front of the ear.

After the lower flaps had been secured into proper position the tongue-shaped flap, *E*, was dissected loose and freed. Its point was twisted down and out and fastened by a strong, deep suture to the point at the external commissure, and the flap was stitched

into situation by several superficial sutures. During the procedure there was profuse bleeding, which was arrested by heat and torsion of the bleeding vessels. Each flap was made as thin and as cleaned as possible. All adherent fat was excised. The flaps were kept warm by hot sponges and the exposed raw surfaces were cleansed and freed from blood-clots before the flaps were sutured into position. The operative field was dusted with powdered iodoform and the external surface was covered with antiseptic gauze and bandaged. At the time of writing this review, nearly two and one-half years later, the scars can be barely distinguished



Before operation.

FIG. 2.—OPERATION FOR EPITHELIOMA INVOLVING BOTH LIDS. (OLIVER.)
Wills Eye-Hospital Reports.

from the natural folds and creases of the skin. Figs. 2 and 3 show the conditions before and after the operation.

Weathered, of Waco, ⁸⁵_{Nov., '94} records a successful plastic operation performed by Cole, of the same place, for the restoration of the lower eyelid, which had been removed for epithelioma. A triangular flap was obtained from the cheek, with its pedicle at the side of the nose, just above the junction of the cartilage and bone, and its base near the angle of the lower jaw.

In the restoration of the lower lid after removal of a malignant growth, Siklossy, Jr., of Budapest, ²⁵¹_{Aug., '95} has recourse to the following modification of Dieffenbach's operation: After the excision of the mass in the form of a triangle with its base up, an horizontal incision is made from the outer-lid commissure similar

to that for canthoplasty, except that the cut is carried to the ear. The skin is dissected from the underlying tissue below this incision, making a triangular flap, thus permitting the two edges of the wound to be united by sliding the flap into place. The length of the horizontal incision is regulated by the size of the opening of the triangle. Should there be too great tension after the flap is united, a vertical incision is made at right angles to the extension of the commissure. When the tumor is removed from the upper lid the author employs the same operation with the triangle placed with its base down. When the tumor involves the inner canthus,



After operation.

FIG. 3.—OPERATION FOR EPITHELIOMA INVOLVING BOTH LIDS. (OLIVER.)

Wills Eye-Hospital Reports.

necessitating the removal of a considerable portion of the thickness of the lower lid, he dissects the remainder of the lower lid free. The operation is equally adapted for the inner or the outer side of either lid. In ectropium he has recourse to a curved incision beginning a few millimetres above the inner canthus and midway between it and the bridge of the nose, and from there running below the zygomatic process. The skin is dissected upward until the flap is made movable and can be placed in its normal position. The slight prominence formed by the folding of the skin which has been brought from below disappears shortly after the operation. In order that the tension may be distributed over a larger territory and the new lid may not appear swollen, the radius of the arc should be made quite large.

To form a new lower lid, Uthhoff, of Marburg, ⁵⁷_{Aug., '95} after excising a carcinomatous mass, made a flap from the upper lid with its base toward the free edge. The flap was then inverted and sewed to the wound of the lower lid so that the skin-surface was nearest the globe. A second flap was now made from the temple and attached to the first flap in the formation of the lower lid. The defect in the upper lid was replaced by the Thiersch method. On the seventh day the inverted flap was separated close to the edge of the upper lid. The case was seen after two months, when a new, deep, lower, conjunctival *cul-de-sac* was found to have established itself.

Peschel, of Turin, ¹⁹⁰_{Oct., '94} has overcome a paralytic ptosis by a modification of Birnbacher's operation. The incision was done away with and three double-needed sutures were passed through the upper edge of the cartilage and tied over a small drainage-tube. The sutures were allowed to remain for twenty-four days and were kept sufficiently tense to permit of the clearing of the lids.

Mules, of Manchester, ²_{May 11, '95} describes the following operation for ptosis: Two needles with their eyes near their points are passed deeply through the frontalis tendon over the eyebrow and their points brought out at the margin of the lid behind the eyelashes, taking up a substantial part of the tarsal cartilage on their way. A piece of silver wire is threaded through each needle, which is then withdrawn, leaving the loop of wire passing from the brow to the edge of the lid and back to the brow again. This is then tightened until the lid is sufficiently raised, the edge of the lid having been slightly grooved to allow the wire to sink into its substance. The two ends of the wire are then twisted on each other until the lid is raised permanently. The ends are cut off and the wire is allowed to sink below the level of the skin. The skin at this point and at the margin of the lid becomes healed over the wire, which remains permanently fixed in the substance of the lid. The author has found that the wire does not produce any irritation. Bourgeois, of Reims ¹⁷³_{May, '96} reports a series of twenty-two cases of entropium and ten cases of ptosis which were successfully operated upon by the methods of Gillet de Grandmont.

Ogston, of Aberdeen, ²_{Dec. 1, '94} admirably succeeded in forming a new socket for an artificial eye. A flap from the temple, including the subcutaneous tissues and measuring three inches by two inches, was divided into two tongues by an horizontal incision extending two-thirds of its length. A second incision at right angles to this was carried through the skin only, at the base of the flap. After freeing the lids the tongues of the flap were turned in, to line the respective lids. A second operation was necessary, owing to the

new socket being found not to centre with the palpebral fissure. The final result was satisfactory.

Diseases of the Conjunctiva.

Armaignac, of Paris, ¹⁷¹_{AUG., '95} reports a case of pigmented nævus of the conjunctiva which had almost covered the internal third of the cornea.

With a view of determining the bacteria in the conjunctiva of a healthy eye, Lachowicz, of Wilna, ²⁵⁴_{APR., '95} made a bacteriological study of 63 healthy conjunctival sacs. Of this number bacteria were found in 31 per cent., in 11 cocci alone, and bacilli alone in only 4. The following were the varieties of the bacteria found: *Staphylococcus pyogenes aureus*, *micrococcus candicans*, *streptococcus pyogenes*, *sarcina lutea*, *micrococcus coronatus*, *bacillus sporiferus*, *bacillus fluorescens putridus*, *bacillus xerosis conjunctivæ*, *micrococcus cereus albus*. In order to determine the effect of the bacteria taken from the eye, he injected several varieties of them into the healthy conjunctival sac and found that they produced no deleterious action. From these experiments he has arrived at the following conclusions: (1) in contradistinction to other mucous membranes, the conjunctiva of the healthy human eye is usually free from known micro-organisms; (2) the micro-organisms which are occasionally found in healthy conjunctival sacs come from the air and probably remain but temporarily and in small numbers in the sac; (3) the different organisms disappear from the sac with unequal speed; (4) the healthy eye is quite indifferent to the action of all bacteria. Bach, of Würzburg, ²⁵⁴_{AUG., '95} believes that *staphylococcus aureus* and *albus* are found in the conjunctival *cul-de-sac* and on the lid-edges in 50 to 70 per cent. of all apparently normal eyes. He has found that the eye cannot be made sterile by the application of an antiseptic dressing, but thinks, on the contrary, that such a dressing actually increases the number of bacteria, though not always to the same extent, as after the application of an ordinary moist or dry bandage. He is of the opinion that the disinfecting action of bichloride-of-mercury and oxycyanate-of-mercury dressings, moist or dry, is not of sufficient value to warrant any dependence to be placed upon them as eye-dressings.

Bryant, of Omaha, ⁶¹_{MAR. 16, '95} advises treating burns of the conjunctiva at the end of the first stage in the same manner as any other wound causing a solution of continuity,—by separating the conjunctiva from the sclera round about the burn to an extent sufficient to allow the bringing of the edges together and uniting them with stitches. If, owing to the extent of destroyed tissue, this

plan is not feasible, he employs skin-grafts at the beginning of the healing stage.

Mathieu, of Paris, ¹⁷³_{Dec., '94} has observed an instance of spontaneous conjunctival hæmorrhage originating in a cyst of that membrane that had undergone angiomatic change. The case occurred in a woman 50 years old. A fatal case of hæmorrhage from the conjunctiva of the upper lid in a 7-month-old child has been reported by Stoewer, of Greifswald, ¹³_{May 15, '95}. The bleeding was found to be due to a vascular granuloma, which was constantly irritated by the movements of the globe and lid. The hæmorrhage ceased during sleep. Bala, of Gopel-Chhatarpur, ²_{Feb. 9, '95} reports a death from hæmorrhage, in an infant of 2 months, following the destruction of papillary granulations of the conjunctiva by use of sugar-cones (Batasa). The operation was performed by a Kabiraj.

A case of severe and repeated hæmorrhage from a small, jagged-edged ulcer in the middle of the palpebral conjunctiva of the left upper lid, in a married woman aged 27 years, has been seen by Jessop, of London, ²_{May 11, '95}. When first seen the patient was in collapse. The hæmorrhage was controlled by the use of the actual cautery and ice compresses. There was no history of hæmophilia or traumatism. The author considers the ulcer to have been nævoid in origin.

Russel, of Hackney, Australia, ²⁶⁷_{May 15, '95} removed twenty-three maggots, apparently several days old, from the conjunctival sac of a man 77 years old. There was a rodent ulcer at the inner angle of the upper eyelid.

Twenty cases of ante-partum ophthalmia neonatorum have been collected by Friedenwald, of Baltimore, ⁹_{Mar. 9, '95}. In 7 the rupture of the membranes occurred between forty-eight and seventy-two hours before birth, in 2 from seventeen to nineteen hours, in 2 within eight hours, in 1 shortly before the birth of the child, and in another only three hours before birth; in 7 instances the time of rupture is not stated. The author believes that infection took place probably soon after rupture of the membranes, the infective material being carried, in most cases, by the examining physician or midwife. Ayers, of New York, ⁵_{June, '95} thinks that the propensity of newborn infants to rub their eyes with their fists is a source of contagion, and that the first act of the medical attendant should therefore be the cleansing not only of the lids and eyes, but also the face and hands.

Parinaud, of Paris, ³¹_{Jan. 10, '95} has described a mild form of conjunctivitis in the newborn attended with but little pus, with much lachrymation, and with very moderate injection of the palpebral conjunctiva. The pneumococcus was present in every instance.

Francisco, of New York, ¹¹⁷¹_{Jan., '95} has made a study of 40 cases of ophthalmia neonatorum, in 30 of which the gonococcus was present and in several of the remaining the Weeks bacillus of acute catarrhal conjunctivitis could be found. The cases in which the discharge appeared before the fourth day were all gonorrhœal in character, the gonococcus being demonstrable as long as sufficient pus for microscopical examination was obtainable. The average duration of these cases was fifty-three days; and, of the 60 eyes involved, 6.33 per cent. terminated in staphyloma, 5 per cent. in badly-impaired vision, and 10 per cent. in slightly-impaired vision. In almost every case of corneal ulcer the lesion occurred before treatment was inaugurated. The average duration of non-gonorrhœal cases was thirty-six days, and all pursued a mild course.

Pflueger, of Bern, ²¹⁴_{Sept. 15, '95} has determined that 20 per cent. of all cases of blindness are found in youth, and, of these, 20 to 25 per cent. are caused by blennorrhœa neonatorum. In 85 per cent. of these cases the affection begins within five days after birth, and, if immediately treated, 70 per cent. are cured. Early corneal complications are the gravest. He suggests that midwives should be instructed and required to immediately report all diseased eyes to the proper authorities. The substitution of 1-per-cent. solution of bichloride of mercury for the nitrate of silver of Credé's method, as suggested by Mueller, should never be made, as albuminate of mercury so formed produces rapid destruction of the eye.

Six cases of conjunctivitis due to pneumococci, two in newborn infants and four in adults, have been reported by Gasparrini, of Siena. ³⁰_{Jan., '95} In all the right eye was first affected, the left being involved three or four days later and always less severely. Conjunctivitis due to pneumococci may always be suspected when a patient presents a scarcely reddened, palpebral conjunctiva with a very marked arborescent vascularization of the ocular conjunctiva and slight ecchymosis near the corneal border, the secretion being more lachrymal than catarrhal and containing floating mucofibrinous flakes.

To avoid the conjunctivitis frequently induced by silver nitrate, employed after the method of Credé, Budin ²⁴_{Feb. 17, '95} uses the remedy in the strength of 0.66 per cent. (1 to 150), and has only had 2 cases of ophthalmia in 2004 children and but 7 cases of secondary conjunctivitis.

In the treatment of ophthalmia neonatorum, Kalt, ²⁷⁴_{Dec., '94} of Paris, strongly recommends free irrigations twice daily, or oftener, in severe cases, with 1 to 5000 potassium-permanganate solution, introduced by means of a hard-rubber tube with a perforated, flange-like expansion. The irrigator is introduced under the lids

in such a way that they may be closed over it. Rohmer, ¹⁷¹_{Dec., '94} of Nancy, in such cases, recommends thorough and frequent irrigation of the *culs-de-sac* with boric acid or other mild antiseptic. In the early stages Owen, of Birmingham, ³²_{Nov., '94} advises frequent irrigation with bichloride of mercury (1-3000 to 1-4000) and brushing the palpebral conjunctiva with nitrate of silver (2 grains—0.13 gramme—to 1 ounce—30 grammes). In the later stages he employs the same remedies in the respective strengths of 1 to 1000 and 10 grains (0.65 gramme) to 1 ounce (30 grammes), applied with a brush, the surplus being neutralized. Fromaget, of Bordeaux, ¹⁷¹_{Feb., '95} has used formalin, in 1 to 2000 strength, as a wash, and in 1 to 200 as a collyrium, with excellent results. In the purulent conjunctivitis of adults it is a valuable adjuvant to silver.

Vignes, of Paris, ⁷³_{July 13, '95} urges the intelligent use of nitrate of silver, preferably in 1-per-cent. solution, carefully applied, using a 3-per-cent. solution later, if necessary. To arrest the progress (and in very bad cases, where there is a free greenish-yellow discharge) he employs the mitigated stick. Irrigations of mercuric bichloride having proved irritating to the corneal epithelium, he employed a solution of 1 to 4000 potassium permanganate instead, applying this to the everted lid by absorbent cotton. Wilson, of Philadelphia, ¹⁴⁴_{May, '95} reports good results from irrigation with sterilized water. Abadie, of Paris, ⁷³_{Dec. 22, '94} denounces any treatment of this disease that omits silver nitrate, in 3-per-cent. solution, thoroughly applied twice daily, and insists that it alone will cure severe cases. Benign non-gonorrhœal cases of ophthalmia in infants, however, will yield to other methods as well.

Lor ⁸⁶⁸_{Dec. 15, '94} noted two abscesses of the subconjunctival tissue, or tarsus, during the decline of a case of ophthalmia neonatorum, which he considers to have been of gonorrhœal origin and analogous to cases previously observed by Berger.

Darier, of Paris, ¹⁷¹_{June, '95} reports a case of pseudomembranous conjunctivitis in a newborn child. Bacteriological examination showed the pure streptococcus. Injections of 6, 7, and 8 cubic centimetres ($1\frac{1}{2}$, $1\frac{3}{4}$, and 2 fluidrachms) of Roux's serum were followed by improvement for two days, terminating in sudden aggravation and total loss of both corneæ. He thinks that, in the prognosis of ocular diphtheria, we should take into account, first, the tender age of the patient; second, the early appearance and extent of corneal lesions; third, the participation of the bulbar conjunctiva in the diphtheritic process; fourth, the predominance or exclusive presence of the streptococcus.

R. H. Derby, of New York, ¹¹⁷¹_{Jan., '96} gives notes of a case of pseudomembrane of the conjunctiva in a girl 7 years of age.

When first seen the eye had been inflamed for one month and a history was given of shedding of casts of the eye. The membrane was fibrinous and was easily rolled from the conjunctival surface except at the fornix, where it was adherent to a vascular growth having the appearance of granulation-tissue. The underlying conjunctival surface was glassy and smooth. The cornea was infiltrated and vascular at the margin. Cantholysis was made and Labarraque's solution (1 to 7) and ice were locally applied. There were several relapses, but ultimate recovery occurred. Five years later the patient returned with a similar condition. At this visit removal of the membrane left a granulating, bleeding surface. Panophthalmitis then supervened and the eye was enucleated. Inoculation of the eyes of rabbits with pieces of the membrane caused no undue disturbance, but similar experiments with streptococci which formed upon the culture-media produced panophthalmitis. The author does not think that the bacteriological findings serve to explain the persistent appearance of the pseudo-membrane.

Valude, of Paris, ²⁷⁴_{Oct., '94} urges against all irritating remedies in the treatment of pseudomembranous conjunctivitis, and believes that silver nitrate is especially harmful in this disease.

Weeks, of New York, ¹¹⁷¹_{Jan., '95} states that the evidence collated suffices to establish the fact that the etiological factor in acute contagious conjunctivitis is a small bacillus not identical with any other known variety.

Campbell, of Windsor, ²⁰²_{Aug. 10, '95} reports two cases of gonorrhœal ophthalmia. The first was of interest owing to the age of the patient—a girl, 5 years of age, with purulent vaginitis—and the second from the mode of infection,—through the medium of a towel which was being used in common with a fellow-workman who was suffering from gonorrhœal urethritis.

In asserting anew the great superiority of nitrate of silver in 3-per-cent. solution in the treatment of this disease, Abadie, ⁶⁷_{Jan. 15, '95} of Paris, insists on the great importance of thoroughness in reaching all parts of the conjunctiva.

Vian, of Toulon, ¹⁷³_{Aug., '95} reports the successful use of solutions of potassium permanganate in purulent ophthalmia and dacryocystitis due to micro-organisms. The strength of the solution used varied from 1 per cent. up to 10 per cent., according to the character of the case. He also notes the cure of a case of diphtheritic conjunctivitis by crude oil of petroleum. In the treatment of purulent conjunctivitis, Vacher, of Orleans, ¹⁷³_{June, '95} uses prolonged subpalpebral irrigations of nitrate of silver or permanganate of potassium, occasionally cyanide of mercury and sublimate, and inserts the

blunt, olive-shaped end of a glass cannula well into the conjunctival *culs-de-sac*. When the cornea is implicated in this affection, Tweedy, of London, ¹⁵_{Mar., '95} substitutes, for any other solution which may have been used, one of sulphate of quinine 4 grains (0.26 gramme) to the ounce (30 grammes), made with the smallest quantity of dilute sulphuric acid that will keep the quinine well in solution. He believes that quinine thus prepared is powerfully antiseptic and also antiphlogistic. This lotion is to be used only in the intervals, and not as a substitute for silver, for nothing can be relied upon to save the eyes in purulent ophthalmia in infants or adults except the intelligent, determined, and systematic use of the nitrate of silver.

From a study of the cases of conjunctivitis occurring during a month's time in the jail at Colombo, made by Ragasingham, of that city, ⁶_{Mar. 9, '95} it would appear that this affection is most frequent in May and least in October, that females are almost exempt, and that occupation is a predisposing cause.

Schmidt-Rimpler, of Göttingen, ⁴_{Jan. 7, '95} believes that trachoma and follicular conjunctivitis are two different affections, because of the milder and shorter course of the latter, as well as by the absence of the corneal complications that are so characteristic of trachoma. He has noted cases of trachoma directly transmitted from patient to patient, but believes that epidemics are usually of the follicular variety. He treats obstinate cases of follicular conjunctivitis and all cases of trachoma with Knapp's roller forceps, using cocaine as the local anæsthetic. Solution of bichloride of mercury, 1 to 5000, is used as the cleansing lotion, and ice-compresses are applied.

Out of 2800 cases examined from June 1 to August 8, 1894, at Krasnijby, by Kruedener, of Königsburg, ²¹_{June 22, '95} 1416 were found to be suffering from trachoma. The resulting trichiasis was treated by making the intermarginal cut in the lid in such a way that the upper flap containing the cilia was made freely mobile upon the lower (inner). Separation was produced by three vertical stitches tied over beads. The necessity of excising any tissue may be obviated by allowing the medium and, at times, the other stitches to run parallel to the edge of the lid. The exposed wound is covered with transplanted mucous membrane, thus producing a permanent effect when the scar-tissue has ceased contracting.

Würdemann, of Milwaukee, ¹⁰⁰⁷_{Oct., '94} recapitulates his views in regard to trachoma as follows: "Trachoma and follicular conjunctivitis are not independent affections, but diseased conditions resulting after infection from various sources. The trachomatous state follows that of follicular inflammation, through which it must have

first passed. Infection from either may give rise to simple conjunctivitis, but, coupled with poor hygienic surroundings, either or both conditions may develop in the individual receiving infection. In most cases of granular conjunctivitis, dietetic, hygienic, and general treatment is as necessary as are local applications."

Walter, of Odessa, ²⁵⁴_{May, '96} has examined 2154 cases in the small towns of Russia, 30 per cent. of which suffered from trachoma, and of these 27.7 per cent. were also afflicted with entropium, trichiasis, and distichiasis and 67.1 per cent. with pannus. The author believes that Knapp's rollers are to be used only in connection with nitrate of silver or sulphate of copper, and then only in chronic cases.

Vanderstraeten ⁴⁵⁴_{Nov., '94} has shown that the decline of trachoma in the Belgian army has been steady and rapid. The disease has been reduced from 22.99 per cent. in 1840 to 0.22 per cent. in 1893. This has been accomplished by general hygienic measures and isolation of the affected soldiers.

In the treatment of granular conjunctivitis, Lal Madhud Mukherji, of Calcutta, ⁶_{Feb. 9, '96} has found nothing equal to dusting the lids with tannic acid twice daily.

In addition to eighteen previously reported cases, Malgat ¹⁷³_{Feb., '95} cites twelve instances of this disease successfully treated by electrolysis. Under cocaine anæsthesia he touches each of the granulations, for several seconds, with a fine, steel needle connected with the negative pole of the battery. A constant current of 6 or 7 milliamperes is employed, and from twelve to sixteen applications are usually necessary. In most cases excision of the superior *cul-de-sac* by Galezowski's method is required in addition. The advantages of the method are: freedom from pain, simplicity, absence of scar on the conjunctiva, and restoration of the lids to their normal condition.

In treating cases of trachomatous keratitis, Mulder, of Groningen, ¹⁷¹_{Mar., '95} excises all the muscular fibres situated in the tarsus, thus decreasing the blepharospasm and the ptosis, which tend to continue the condition. In trachoma Lavrentieff ¹¹⁵³_{Apr. 27, '95} everts the lid, incises and cures each granule, and then touches each swelling with 1 to 1000 bichloride, washing the conjunctiva with the same solution from four to seven days after the operation.

In order to prevent the further progress of xerophthalmos resulting from this disease, Androfsky, of St. Petersburg, ²⁵⁴_{Apr., '95} employs the operative procedure introduced by Rudim, which consists in a shortening of the palpebral fissure. By this method sufficient moisture is obtained from the atrophic glandular structure of the conjunctiva to clear the cornea of any existing pannus

and in some instances to restore to useful vision. Summers, of Waukesha, ⁶¹_{Sept. 22, '95} noticed rapid disappearance of a cauliflower excrescence on the conjunctiva of the lower lid after several applications of a paste of glycerin and peptenzyme.

Stephenson, of London, ²_{May 11, '95} observed recurring hæmorrhage for over a period of five months following expression for trachoma in a girl 11 years old. The conjunctiva was uniformly red and turgid, but the bleeding-points could not be detected. There was no history of hæmophilia or any kindred affection.

Uthoff, of Marburg, ⁴_{Nov. 5, '94} reports five cases of diphtheritic conjunctivitis in young children in which healing took place in two to three weeks without leaving any scars. The bacteriological examination revealed, in each instance, the presence of the Klebs-Löffler bacillus, as well as streptococci and staphylococci. A case of diphtheritic membrane of the conjunctiva is noted by Gayet, of Lyons, ²⁷⁴_{Mar., '95} in which injections of the antitoxic serum were used. At the same time local treatment by nitrate of silver and lemon-juice was employed. Only partial success attended the trial, the cure taking about forty days and leaving marked corneal disturbance. Schirmer, of Greifswald, ²⁰⁴_{B. 40, H. 5} points out that not only are severe cases of diphtheritic conjunctivitis caused by the diphtheria bacillus, but that comparatively light diseases of the conjunctiva with a formation of croupous deposits may also be caused by the same bacillus without any diphtheritic infiltration of the conjunctiva. In both instances the cornea has a tendency to participation. He reports four cases of the latter class.

Morax, of Paris, ¹¹⁵³_{May 11, '95} has successfully treated three cases of diphtheritic conjunctivitis with serum injections, and cites seven other instances which were treated in the same manner, the results being so good in all that the author considers it as the best form of medication.

Fuchs, of Vienna, ⁶_{Aug. 3, '95} described twenty-three cases of a rare form of recurrent ophthalmia in which coarse injection of the bulbar conjunctiva and of the episcleral vessels were observed, accompanied by photophobia and pain on movement of the eyes. In some cases there was also removal of the near point, or spasm of accommodation. The conditions occurred at intervals of a week or fortnight and affected both eyes alternately. The disease appeared to be associated with gout, rheumatism, and malaria, and seemed to be precipitated by catarrh. Salicin and quinine were found to delay the attacks. Parinaud and Morax, of Paris, ¹⁷¹_{Dec., '94} have found that mild cases of conjunctivitis, usually associated with catarrh of the sac, and especially with coryza, which occur soon after birth and are often mistaken for mild gonorrhœal ophthalmia, are due

to the pneumococcus, although the manner of infection is still unknown. Treatment is unsatisfactory, simple washing in most cases being the best procedure. Miquet¹⁴_{Mar.20,'95} insists on the gravity of phlyctenular affections, and advises active treatment by copious irrigations with 1 to 5000 bichloride-of-mercury solution, at least once daily, as well as the application of a bandage, in conjunction with general tonic measures.

Courtesy⁹⁹⁶_{Oct.25,'94} accepts the views of Fuchs as to the origin of pterygium from pinguecula, believing that traumatic and external influences have but little to do with its causation. Lopez, of Havana,¹⁷¹_{Nov.,'94} believes that pterygium springs from pingueculæ which have been mechanically irritated. He aims at obtaining rapid and precise union of the conjunctival flaps after the extraction of one of them, and unites the freshened edges by freely undermining the conjunctiva at the edge of the wound. Deschamps, of Grenoble,¹⁷¹_{July,'95} advocates systematic scraping of the cornea in pterygium in preference to galvano-cauterization. He claims that it disinfects the denuded surface as well as any other means, and has the advantages of smoothing it and of not destroying the healthy parts. After the removal of a large pterygium covering two-thirds of the cornea, Schirmer, of Greifswald, successfully¹³_{Jan.10,'95} covered the resulting corneal wound with several flat, thin sections of a young rabbit's cornea which had been previously excised. He used no stitches, but considers it advisable to stitch the grafts to the conjunctiva. The pterygium was used to cover a large symblepharon which existed in the same case.

Juda, of Amsterdam,¹⁷¹_{Mar.,'95} reports a case of cysticercous cyst under the conjunctiva in a boy 6 years old. It resembled a serous cyst and occupied the space between the cornea and the caruncle. Lawford, of London,⁷⁶_{June,'95} observed a case of ophthalmia nodosa in an eye which had been struck by a fox-moth caterpillar (*Bombyx rubi*). The resulting inflammation, which was severe and protracted, left the eye but little damaged. Two hairs were removed from the lower part of the conjunctiva. The affection was probably toxic in origin, the poison being contained in the hairs, which in some caterpillars may be found in glandular enlargements at their bases.

A case of accidental sponge-grafting of the conjunctiva is reported by A. G. Thomson, of Philadelphia.⁹_{Apr.13,'95} The fragment, which was firmly implanted in the palpebral conjunctiva, was oval in shape and yellowish in color, measuring eight by seven by three and one-half millimetres. A microscopical section showed a mass of granulation-tissue, in different stages of development, intersected in all directions by a net-work of yellowish bands that represented

the sponge-skeleton. The base of the new growth was composed of embryonal, more or less developed connective tissue, which, in the deeper layers, had quite replaced the sponge-fibres. From the undoubted evidence of formation of new tissue, from the non-irritating properties of the sponge as seen, from the means under which it was introduced and the length of time it remained in the conjunctival sac, and from the microscopical proof of its final absorption, the author has every reason to believe that sponge-grafting is a valuable means of replacing tissue lost by burns or injuries to the eyelids, which are eventually followed by ectropium, entropium, symblepharon, etc., and from the disfigurement caused by shrinking cicatrices.

A clinical and anatomical study of the simple, or serous, cysts of the conjunctiva has been made by Rombolotti, ²⁵⁴ June, '95 of Pavia, in connection with the case of a boy who had received a perforating wound of the eye three years previously. There was a large growth springing from the lower fornix, which had almost attained the height of the equator of the globe. Rapid healing followed puncture of the tumor and excision of a segment of its wall. The case is of interest from a diagnostic stand-point, upon account of the possibility of its being mistaken for a subconjunctival hæmorrhage, and because there was no connection with it and the scar, which was situated in the upper limbus of the cornea. Histologically the cyst was found to originate in a dilatation of Krause's gland.

An instance of papular syphilide has been seen by Rothschild, of Paris, ⁷⁸ Mar., '95 in a woman with secondary syphilis. The ocular lesion presented itself as two flat, slightly elevated, hyperæmic areas in the conjunctiva, which protruded into the cornea. The local condition improved under specific treatment, leaving a grayish pellicle on the normal tissue of the parts.

Black, of Denver, ⁶¹ July 6, '95 has observed a case of angioneurotic œdema of the ocular conjunctiva in a male, there being great swelling of the mucous membrane and of the lids, without other evidence of serious inflammation. The symptoms appeared and subsided rapidly. Van Duyse, of Gand, ²⁷⁴ Dec., '94 records two cases of hyaline degeneration of the conjunctiva, of the clinical type first described by Oettinger. The main points of interest were their occurrence in non-trachomatous patients and the absence of amyloid material. The pathological study led to the view that in these cases the hyaline matter, while chemically distinct, was closely associated clinically with the usual predecessor of the true amyloid change.

Hansell, of Philadelphia, ¹¹⁹ Jan., '96 cites an instance of gummata

of the conjunctiva in a negro man, aged 31 years, who had acquired syphilis ten years previously.

Zimmermann, of Jena, ³⁵³_{Nov., '94} has contributed three observations bearing on the pathological anatomy of polypoid neoplasms of the conjunctiva. The first case observed by him occurred as a small, pediculated tumor hanging from the conjunctiva of a child who presented the symptoms of a phlyctenular keratitis. Pathological examination of the growth showed it to be tubercular in nature and of ectogenic origin, probably induced by rubbing of the eye. The second growth occurred in a man 57 years old, following a traumatism. The clinical diagnosis of papilloma was substantiated by the microscope. The third case, in a boy 11 years old, presented itself as a short, pediculated, papillary tumor of the conjunctiva which bled freely to the touch. The microscope revealed the growth to be a soft, vascular fibroma in which the connective tissue had given way to a younger formation. The great hæmorrhage which followed irritation of the tumor was due to the hæmophilic diathesis of the patient.

As proof of the view that epithelioma of the bulbar conjunctiva may penetrate into the globe through the point of least resistance,—i. e., the sclero-corneal junction,—Lagrange and Mazet, of Bordeaux, ²⁷⁴_{Dec., '94} carefully studied a case of this nature and demonstrated the tract through which the tumor penetrated the eyeball. Franke, of Hamburg, ³¹_{Feb. 13, '95} presented a case of primary tuberculosis of the conjunctiva, the tubercles occurring on the bulbar portion.

A case of leprosy of the conjunctiva, with subacute, plastic, adhesive inflammation of the iris has been observed by Lagrange, of Bordeaux. ¹⁴_{Sept. 29, '95} The cornea was not involved. Excision and application of the thermo-cautery gave the best result.

Diseases of the Cornea and Sclerotic.

Baas, of Freiburg, ¹⁹⁰_{Oct., '95} cites an instance of congenital disease of the cornea in an 11-year-old boy. The disease took the form of an annular opacity at the sclero-corneal junction, while the central part of the cornea was diffusely hazed. In the other eye there were traces of old iritis. Of ten children, nine of whom were living and of whom the patient was the fourth, the two oldest presented similar corneal opacities. Although the author is inclined to view the condition as a product of intra-uterine disease, he believes that there is also a strong teratological element concerned. Würdemann, of Milwaukee, ¹⁰¹⁸_{Oct., '94} records two instances of atypical congenital anomalies of the cornea. The first was that of congenital staphyloma or coloboma, seen in a woman 50 years of age.

The defect consisted in the implantation of a small oval segment of clear hyaline refracting tissues over the lower part of the left cornea. The condition was associated with sequelæ of trachoma, microphthalmos, nystagmus, and paralysis of the external rectus of the fellow-eye. Later, owing to an injury, the corneal segment became leucomatous. The second case was one of congenital bucephthalmos of the left eye in an infant 6 weeks old. The corneal diameter was twenty-one millimetres; that of the right eye equaled ten millimetres. The globe was flattened and its tension was minus.

In the pathological microscopical anatomy of the congenitally opaque corneæ of a full-term infant 3 days old, Tepljaschim, of Kasan, ²⁵⁴_{May, '95} found several long, thin blood-vessels in the substantia propria of the right cornea near its middle. Numerous round and spindle cells were especially visible in its posterior layers and in the anterior layers of the iris. To a less degree round-cell infiltration occurred in the sclera, the outer layers of the choroid, and in the vitreous humor near the posterior layer of the lens. In the left eye a large exudate, consisting of a round-cell infiltration, extended from in front of the iris to the endothelial lining of the cornea, while the other changes were similar to those of the right eye, although the cellular infiltration of the left eye was not so marked posteriorly. The lamellar structure in both eyes was normal. The author thinks that the ocular changes were due to intra-uterine inflammation induced by hereditary syphilis, the opacity of the cornea of the right eye following a diffuse interstitial keratitis, and that in the left an inflammation of the posterior wall of the cornea. In the cornea of a cyclopean eye associated with microphthalmos of the other side he found the lamellar structure of the substantia propria of the inner half of the cornea replaced by fibrous tissue in which numerous cells with thin, long nuclei could be seen. The outer portion of the cornea was quite normal. The opaque corneæ here were the result of faulty embryonic development.

Hansell, of Philadelphia, ⁹_{Aug. 2, '95} removed a piece of iron from the cornea which had been spontaneously extruded in part through this membrane. Fifteen years previously the patient had had a minute fragment of the point of an axe enter the eye.

In a case of dense-white opacity of the cornea following the use of a lotion containing acetate of lead, seen by Risley, of Philadelphia, ²¹²⁹_{v.1, No.1} chemical analysis of the substance removed by curetting failed to demonstrate the presence of lead.

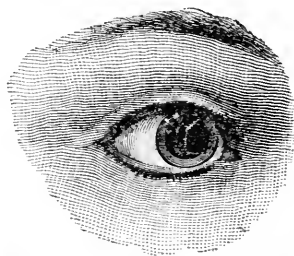
Abadie, of Paris, ¹⁷¹_{Aug., '95} states that a corneal ulcer is due to a more or less extended lesion of the cornea and to the presence of

infecting material which has remained in contact with the denuded corneal tissue for a sufficient length of time. In the treatment he has obtained excellent results by the galvano-cauterization of the ulcerous area. He prefers perforating the cornea with the cautery to a Saemisch section. As the process, however, always leaves a permanent leucoma, he has of late used subconjunctival injections of two drops of bichloride, 1 to 1000, with very good results. He quotes two cases in which rapid cure was thus effected with a minimum of damage to the cornea, the cauterization or section of the ulcer being obviated by this method.

A case of filamentary keratitis in a robust adult has been observed by Macleish, of Los Angeles.⁵⁹ Mar. 16, '95 When the patient came under observation two foci of infiltration of the cornea had coalesced, the primary areas having broken down. One and one-half millimetres from the margin of the cornea down and in, and three millimetres from the ulcer, there was a pellucid, knob-shaped elevation with all the other characteristics of the affection. Later several other filaments appeared. The treatment, which proved efficacious, consisted in the removal of the filaments and surrounding epithelium with a probe. Ziegler, of Philadelphia,¹ Nov. 3, '94 holds that simple corneal ulcer is a purely local inflammatory process, arising chiefly from infection by septic secretion and originating in lachrymal nasal lesions. The plan suggested by him is to treat the nose locally with compound tincture of benzoin and to use a cleansing spray, at the same time using a mild antiseptic eye-wash, a mydriatic if necessary, hot applications when indicated, and regulating the diet and hygiene, with salt-water baths. In the treatment of infectious ulcers of the cornea, Rogée, of St. Jean d'Angely,¹⁷¹ Oct., '94 employs an occlusive compress bandage, with bichloride of mercury 1 to 10,000 and washes of resorcin in water. Uthoff, of Marburg,⁴ Nov. 5, '94 has found that *ulcus cornea serpens* is most probably caused by the Fränkel-Weichselbaum diplococcus.

De Schweinitz, of Philadelphia,¹¹⁹ July 6, '95 gives the notes of a case of malarial keratitis in which the inflammation was manifested as a peripheral annular parenchymatous infiltration separated from the corneal margin by a zone of clear tissue. The opacity consisted of numerous minute points joined by fine, grayish lines sometimes so closely packed together, however, that the intervening striae could not be distinguished. Examination of the blood failed to show any malarial organism. Tenderness in the supra-orbital notch was marked. Antonelli, of Naples,¹⁷¹ May, '95 reports a variety of parenchymatous keratitis which is quite rare, having its origin and evolution in common with that of uveitis from secondary, acquired syphilis. The corneal infiltration is superficial and produces no

greater pericorneal injection than that of concomitant iritis. The cornea does not become vascularized and fails to show any epithelial lesions. Under specific treatment it may again become transparent at the same time that the iritis is cured. This form is different from typical diffuse interstitial keratitis, and is described by Hock under the name of "punctate interstitial keratitis." In the right eye of a woman, 30 years of age, who had had early manifestation of inherited syphilis in the form of interstitial keratitis and internal-ear disease, Fridenberg, of New York, ¹¹⁷¹_{Jan., '95} has observed a system of extremely fine, black filaments of a uniform calibre forming a peculiar regular geometrical figure presenting the appearances of the so-called spider-lines in a telescope, although much more complicated in arrangement, as shown in the accompanying figure. Both eyes were highly myopic and presented disseminated choroiditis. As there was no trace of vascularization or of degenerative blood-vessels in the deeper layers



APPEARANCE OF GEOMETRICAL SYSTEM OF OPAQUE LINES IN THE CORNEA.
(FRIDENBERG.)

New York Eye and Ear Infirmary Reports.

of the cornea, the author is inclined to believe that these opaque lines are "casts" of the lymph-channels of the deeper corneal layers, and that they are entirely independent of newly-formed blood-vessels, which may also be present.

A case of superficial punctate keratitis (Fuchs) in a young woman of rheumatic habit and ancestry, suffering at times from a slight rhino-pharyngitis, has been seen by de Schweinitz, of Philadelphia. ¹¹⁹_{July 6, '95} In less than a month no trace of the affection was discoverable. The author thinks that this rapid disappearance was possibly due to the employment of alterative treatment. Kuthe, of Berlin, ¹⁹⁰_{Oct., '94} has contributed to our knowledge of keratitis neuro-paralytica by giving the clinical notes of a case in a man, 41 years old, who had received a fracture through the base of the skull. The corneal disease manifested itself eight days after the injury, and was associated with an absolute anæsthesia of all the branches of the right trigeminus, the abducens, and the hypoglossal, with a paresis of the olfactory of the same side. The author deems the

case of interest pathogenically by reason of the fact that the seat of the lesion could be definitely determined to be basal through the temporal bones, and pathologically upon account of the clinical picture of the disease which it presented. In a second case a keratitis paralytica of the right side was associated with total paralysis of the abducens of the same side. In this instance the corneal disease recurred several times.

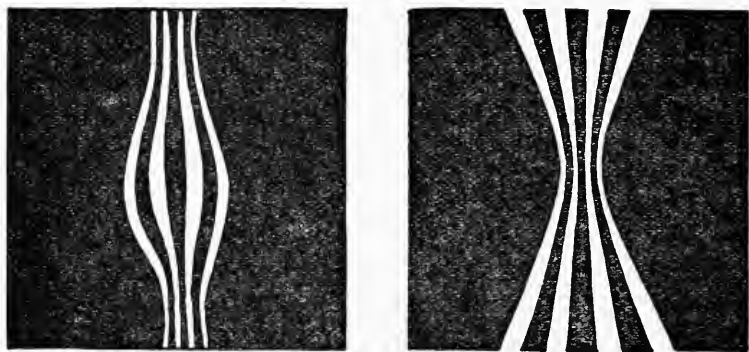
In the treatment of scrofulous diseases of the eye, Hoeltzke, of Berlin, ¹⁵⁸_{B.18,H.1,2,'94} lauds the local use of calomel in addition to general hygienic measures. In corneal ulcers with grayish-yellow infiltrated edges, the calomel is substituted by hot stupes of 1 to 5000 bichloride-of-mercury solution. Atropine should rarely be used in these affections. Marti, of Basel, ²¹⁴_{Sept.1,'95} has recourse to subconjunctival injections of sterilized salt solution—maximum strength, 4 per cent.—in the treatment of destructive and other inflammations of the cornea and in various affections of the uvea and vitreous humor. Aristol has been found by Heuse, of Elberfeld, ¹¹⁶_{Feb.,'96} to be of value after the failure of other measures in clearing the base of corneal ulcers. It is applied in powder, the eye being closed for a few minutes after its application. It is of no value in the further repair of the cornea, but is of use in ulcerous blepharitis and in obstinately recurring styes, employed in the form of a 5-per-cent. salve, being better than the mercuric yellow oxide because it is non-irritating. Scott, of Cairo, Egypt, ⁷⁶_{Nov.,'94} claims good results in the treatment of vascularized corneæ by slitting each vessel along its whole course with a small Graefe cataract-knife. During the procedure the field of operation is magnified by a lens.

Fick, of Zürich, ²¹⁴_{Aug.1,'95} believes that corneal transplantation cannot be successfully made with any tissue resembling the human corneal structure, but that it should be tried with one which will be unaltered after separation from its mother-structure. He suggests for this purpose the embryonic corneæ of half-matured sheep or goats, the embryonic rabbits' corneæ being found unavailable. In four cases of cats' corneæ transplanted in rabbits' eyes he found the epithelium thickened, the corneal tissue opaque, and the fibres irregular, bent, and surrounded by eosinophile leucocytes, giant- and pigment- cells, blood-vessels, etc. Descemet's membrane was retracted beyond the flap.

The curvature of a flattened cornea, the reverse of keratoconus, has been found by Axenfeld, of Marburg, ²⁵⁴_{June,'95} to have two focal centres. The centre of the cornea was hypermetropic and the periphery was myopic, both of which meridians could be corrected with glasses. This peculiar flattening of the centre of the cornea

was due to an ulceration in infancy, which left a perfectly clear membrane. In the diagnosis of this condition the author employs a cylindrically curved piece of thick pasteboard, fifteen centimetres broad, upon the hollow side of which he places alternate black and white stripes, which are thus brought at equal distances from the cornea, in distinction to those of a plain surface, in which the lines are nearer to the centre of the cornea. The reflection of this apparatus upon the corneal membrane is characteristic; in the flattened cornea the stripes are curved away from the centre, while in keratoconus they curve toward it. (See illustrations.)

Trantas, of Constantinople, ¹⁷³_{Mar., '95} describes, as a constant symptom of iridocyclitis, varying degrees of insensibility of the cornea, and gives details of five cases in which the condition was present. He has also found it following operations for cataract where slight



METHOD OF DIAGNOSIS OF FLATTENED CORNEA. (AXENFELD.)

Archiv für Augenheilkunde.

degrees of iritis were present. It progresses steadily with the disease, the sensibility returning as the condition disappears; its cause is a functional disturbance of the corneal nerves, which, in passing through the ciliary bodies, are compressed by infiltration of the inflamed tissue.

Treacher Collins, of London, ²_{May 11, '95} has found that the greenish or red-brown color in blood-staining of the cornea is due to the presence of a number of highly-refracting granules which correspond in spectroscopical appearances and chemical reaction to hæmatoidin. They are scattered throughout the substance of the cornea without definite relation to the spaces between the laminae of fibrous tissue. In some cases, associated with these crystals there was a substance which gave an iron reaction with ammonium sulphide, and which was, probably, hæmosiderin. In eyes thus affected the intra-ocular tension was usually increased from ob-

struction of the angle of the anterior chamber by blood-clots. The author is of the opinion that hæmoglobin is first diffused into the cornea from the anterior chamber through Descemet's membrane, and that the hæmatoidin, which is insoluble in the fluids of the cornea, becomes precipitated. The absorption of the granules commences at the periphery and progresses in all directions, the more slowly as it becomes removed from the sclero-corneal margin. In one instance a discoloration completely disappeared in about two weeks' time.

In the treatment of cervical staphyloma, Walter,²⁵⁴ of Odessa, after excision of an oval flap from the cornea, does not use any stitches, believing them to produce unnecessary irritation. Rogman, of Gand,¹⁷¹ removed a small tumor from the sclero-corneal region of a boy aged 14 years, which, by histological examination, was shown to be of epitheliomatous nature. The tumor had existed about six weeks before its removal and had never produced pain nor symptoms of inflammation.

Diseases of the Iris and Ciliary Body.

Malgat, of Nice,¹⁷³ records two additional cases of variation in color of the irides (to which he gives the name *chromhétéropie*). In both, as in the six cases reported in 1889, the lens on the side corresponding to the lighter-colored iris had become cataractous. He believes the difference in color to be due to an imperfect development of the blood-circulation in the anterior part of the lighter eye; the blood-supply, although imperfect, is sufficient for the nutrition of the lens for some years, but becomes insufficient in time, and as a consequence cataract inevitably follows. No other lesion can be found, and the condition is considered to be a form of albinism.

Best, of Wermelskirchen,²⁰⁴ has seen eight cases of corectopia and has collected fifty-six observations from other authors. As a result of his studies he concludes as follows: 1. Corectopia is often the only anomaly existing in the eye, and it must be regarded as a pathological variety of slight physiological displacement of the pupil. It may be occasioned either by a faulty conformation of the iris or by an intra-uterine inflammation. When uncomplicated it is unilateral. 2. Occasionally the corectopia is seen in association with conical cornea, microphthalmos, and more rarely with albuminuria or dermoid tumor. 3. On the other hand, associated displacement of the pupil and lens is very characteristic, being nearly always bilateral. The pupil is usually situated up and out, but may be equally often in any other position. There is never any disease of the cornea or discoloration of the iris, and,

in general, there are no signs of inflammation. The iris is frequently atrophic. Often there is an hereditary myopia the origin of which is obscure. 4. There are intermediate types between coloboma, irideremia, and polycoria.

A case of filaria in the anterior chamber of a young Madras woman has been recorded by Drake-Brockman.⁷⁶_{Oct., '94} The eyeball was congested, the cornea hazy, the aqueous muddy, and tension equaled +1. An incision was made with a keratome and the aqueous escaped, but the worm could not be found. The eye became quiet.

Harlan, of Philadelphia,²¹²⁹_{v.1,p.1} cites three cases of cilia in the anterior chamber. In the first instance the cilium had entered the chamber through a wound produced by a wire, which had also occasioned a traumatic cataract. The injury had been received three months previously. One of the hairs projected from the cicatrix in the cornea, while three were lodged upon the iris. The cilia were withdrawn, iridectomy performed, and the lens removed, the eye healing quite rapidly. The second instance was seen in Oliver's clinic at the Wills Eye Hospital and the third in Risley's clinic in the same institution. The presence of the cilia in the anterior chamber seemed to occasion little or no irritation in any of these cases.

A case of traumatic irideremia in which the patient suffered no inconvenience save from the excessive light has been seen by René, of Nancy.¹⁰⁰_{Oct. 9, '94} Vision and accommodation were normal six years after the accident.

Ahlstroem, of Gottenburg,²¹⁷_{v.16,'94} reports a case of traumatic aniridia with conservation of the lens. The iris had escaped from the eye through a rupture in the sclerotic which had occurred up and in about two millimetres from the corneal margin, as the result of a blow with a fist. The eye made a good recovery, $\frac{6}{26}$ vision being obtained.

In hernia of the iris, Grandelement, of Lyons,¹⁷³_{May, '95} splits the tumor with a Graefe cataract-knife, cutting from side to side in the direction of its long axis. The fluid contained in the pocket escapes and the tumor disappears, leaving a clean wound, which is rapidly closed in a few hours by a fibrocellular tissue. By this method all danger of immediate or remote infection or of staphylocoma is avoided.

A case of double ectropium uvae has been seen by Dunn, of Richmond,⁸¹_{May, '95} in a man aged 27 years. The eyes were hypermetropic.

Chauvel, of Paris,¹⁷³_{July, '95} found paralysis of the sphincter of the iris in 23 cases, the majority in middle life. In 13 the right eye

alone was affected, in 7 the left, and in 3 both eyes. Sixteen were emmetropic, 4 were myopic (0.50 to 1.50 dioptries), and 3 were hypermetropic. Regular astigmatism was present in 6 instances. Visual acuity for distance was only slightly reduced. Posterior staphyloma was present in 2 patients; in 17 there was diminution of amplitude of accommodation, but in none was it completely abolished; the field of vision was slightly reduced in 6. The only symptom complained of was a more or less pronounced fogging in near vision, preventing reading or close work. Syphilis was the chief cause (15 cases); other causes were ataxia (2), scarlatina (1), and cerebral softening and traumatism (6). Mixed treatment was administered when syphilis was suspected, and 2 out of 7 cases improved. In the non-syphilitics collyria of eserine and of pilocarpine, in conjunction with stimulating frictions, flying blisters, and a constant current, were applied. Two cures were noted. The same author cites 4 instances of myosis in which both pupils were affected; 3 cases were due to ataxia and 1 to a tropical anæmia. Although the visual field was slightly and regularly contracted in all, visual acuity was not reduced. The amplitude of accommodation was not modified. As the condition produced no trouble, no treatment was instituted.

Reber, of Pottsville, ¹⁰⁰⁷_{May, '95} reports a case of incomplete reflex iridoplegia in the right eye and incomplete accommodative iridoplegia in a man, 25 years of age, in good health and having normal accommodation.

The details of a case of severe double iritis, having its origin in ulceration of the nasal cavities from ozaena, are given by Fage, of Amiens. ¹⁷³_{May, '95} Bacteriological examination of the nasal discharges revealed the presence of the coccobacillus of Læwenburg in great numbers and in almost pure culture. The same germ was found also in the pharynx and conjunctival *cul-de-sac*, but examination of the blood and of the anterior chamber gave negative results. Treatment by washing the conjunctival sac and lachrymal canal with sublimate, hot nasal irrigations, applications of ichthyol, and weak solution of chloride of zinc to the nose, with cupping, atropine, cocaine, and hot applications to the eye, was followed by rapid improvement. He reports a milder case of iritis, due to naso-pharyngeal catarrh, which was immediately relieved by treatment directed to the nasal condition. He believes that the infection is transmitted either through the blood or through the lymphatic channels.

In anterior synechiæ, Gaupillat, of Troyes, ¹⁷³_{June, '95} cuts through the synechiæ by means of a special blunt-pointed knife, the blade of which is curved to represent the third of a circumference and

having a diameter of seven to eight millimetres. An opening less than one millimetre long is made in the cornea with a Graefe cataract-knife, parallel to the radiating fibres of the iris, care being taken to avoid wounding the iris and the lens. The synechotome is then introduced between the cornea and the synechiæ and the latter are cut through by traction with the curved knife. Atropine and bandage complete the operation. The following are necessary conditions for the operation: 1. The synechiæ ought to be sufficiently central that the knife may pass between the point of attachment of the iris and its great circle. 2. At the point chosen for the puncture of the cornea the anterior chamber must be deep enough to prevent a wounding of the iris or to produce an adhesion in this place.

In studying the changes of refraction observed in plastic iritis, Oliver, of Philadelphia, ¹⁷¹_{Dec., '94} has observed no signs of forward displacement of the lens nor increases in the refractive indices of the aqueous and vitreous humors. From these findings he is still more inclined to attribute the condition to his former theory of spasm of the accommodation.

Berger, of Paris, ²⁷⁴_{Nov., '94} has studied a specimen of thickening of the hyaline endothelial membrane of the posterior surface of the iris, with colloid degeneration masses attached. He suggests that morbid changes in this membrane may play as important a part in the pathology of the iris as the analogous membrane of Descemet does in corneal disease.

A case of tuberculosis of the iris, in a boy aged 4 years, otherwise healthy and who presented a good family and personal history, has been recorded by Chevallereau, of Paris, ¹⁷³_{Oct., '94}

Benson, of Dublin, ¹⁶_{Jan., '95} has made a microscopical study of an eye with supposed tubercular iritis, in a girl, 15 years of age, without definite tubercular history. The affection began as a brown spot at the base of the iris and was followed by the appearance of other similar areas, and, later, by blindness. The growth consisted of a granulomatous-looking mass (with a few ill-defined giant-cells) situated near the base of the iris and blocking the angle of the anterior chamber. Lagrange, of Bordeaux, ²⁷⁴_{Mar., '95} has reported a case of primary tuberculosis of the ciliary body and iris. The condition was of three months' standing and the sight had been lost two months after the beginning of the trouble. Examination showed, behind the almost opaque cornea of the left eye, a reddish mass, which had distorted the eyeball by producing retraction of the lower part of the cornea and projection of the anterior superior part of the ball in the form of a dirty-white mass showing small yellowish spots. Microscopical examination of the

mass revealed the presence of tubercles with their characteristic giant-cells and a few bacilli.

In the differential diagnosis of the gumma and sarcoma of the ciliary region, Rochon-Duvigneaud, of Paris, ³⁵_{Apr. 13, '95} believes that the early iritis, the vitreous opacities, perhaps diminished tension, rapid evolution, and bulging of the sclera in the first, as compared with a slow, non-inflammatory onset, with glaucoma later, in the latter, are sufficient to make the diagnosis certain in most cases. In doubtful cases he does not enucleate until a thorough therapeutic test has been made.

Diseases of the Lens.

Fridenberg, of New York, ²⁴⁹_{Apr., '95} has made a careful study of the lens-star figure of man and the vertebrates. Of 100 lenses, in about one-fifth the star was four-rayed, two-fifths five-rayed, one-fifth six-rayed, and in seven cases seven-rayed. In only one or two cases was the star three-pointed. The figure is rarely a true star, the angles being, as a rule, unequal and the rays not issuing from the pole, but usually from a sutural line running through it which is commonly vertical. The division of the rays varies, being at times dichotomous and often dendritic. On the average, the upper quadrant of the lens showed two or three primary rays, in the lower three or four, one or two in the nasal, and one in the temporal. In the lower mammalia the lens-star corresponds in general to that of man.

Thompson, of Indianapolis, ⁵⁶_{Oct., '94} gives the following *résumé* of his observations on some phases of opacity and luxation of the crystalline lens: 1. Segmental opacities of the lower, inner portions of the lens usually remain stationary for many years; rarely do they cause blindness. 2. Annular opacity, or "arcus senilis lentis," is frequently met with in persons under 30 years of age. Women seem to be more subject to it than men; it rarely passes beyond the narrow periphery until after middle life; when it does so, it extends in the form of a very minute, speckled opacity of the whole anterior surface of the lens, again becomes stationary, and very seldom causes blindness. 3. Cataract does occasionally disappear spontaneously not only by the lens falling down behind the pupil, but by liquid disintegration within the capsule. 4. "Congenital ectopia lentis" is by no means a harmless anomaly. Its subjects are liable to glaucoma and to iridochoroiditis. 5. Spontaneous luxation downward of the cataractous lens in elderly persons is also dangerous. It gives sight and joy for a few months, but the end is usually suffering and total blindness. 6. "Second sight" is a danger signal. It is not (as is generally supposed)

always caused by increase in the conjugate axis of the lens incident to incipient cataract, being frequently present before the faintest sign or symptom of cataract has appeared. It is often brought on by long-continued congestion of the fundus (as seen by numerous floating bodies in the vitreous humor) by a relaxed suspensory ligament, which causes luxation of the lens forward. In many cases the opacity of the lens does not commence until years after the foregoing changes have begun.

Owing to the possibility of cataract being due to both local and general causes, Baker, of Cleveland, ¹⁰⁰⁷_{July, '96} suggests that a careful study of these conditions be made in incipency and suitable treatment instituted; should operative interference become necessary it should be done at the earliest possible moment before the general health becomes impaired, preferably by Knapp's method of peripheral capsulotomy with an iridectomy either at the time of the extraction or some time previously. In a study of the influence of astigmatism in the genesis of cataract, Roure, of Montpellier, ¹⁷³_{Jan., '96} has found, in 33 cases of bilateral cataract, 20 in which the more astigmatic eye first became cataractous, 5 in which the less astigmatic eye was first affected, and 8 in which astigmatism was either absent or equal in the two eyes. From this he concludes that astigmatism should not be considered a cause of cataract, but rather as simply a condition which favors its development.

In order to diagnose and study the size and progress of lenticular opacities, Darier, of Paris, ¹⁴_{June 5, '95} advises looking at a candle, situated at the far end of a darkened room, through a high concave glass (— 40 D.). The rays, being strongly diverged, become parallel in the eye and project the lenticular opacities on to the retina.

Several cases of false lenticonus have been studied by Demicheri, of Paris. ¹⁷¹_{Feb., '95} The condition was one of cortical cataract in which the central and peripheral refraction varied greatly, being dependent upon a change in the refractive index. The differing refraction being found, the diagnosis should be made from true lenticonus by a careful study of the images of Purkinje. In the former instance these images are five in number, the two additional being due to images from the anterior and posterior surfaces of the nucleus. Lang, of London, ²²_{Nov. 21, '94} has seen crystals of cholesterin in the lens of a man 50 years of age. The bodies were disseminated pretty evenly throughout, but perhaps more thickly in the posterior cortical.

A curious retinal reflex, which took the form of a crescent, one diameter down and out from the disc, has been observed by Schwarzschild, of New York. ¹⁷³_{Dec., '94} He thinks that the appearance

was due to spherical aberration, caused by an abnormal aggregation of the prismatic fibres of the crystalline lens situated in the visual angle. As characteristic of uric-acid diathesis, Bergmeister, of Vienna, ¹³_{Feb. 15, '95} found a punctiform opacity in the posterior pole of the lens of an otherwise normal eye. He has also seen a beginning lenticular haze disappear with a lessening of the excess of uric acid.

An instance of congenital cataract of both eyes of a rabbit has been found by Vuellers, of Düsseldorf, ²⁰⁴_{B. 4, II. 5} the capsule and lens of one eye being perforated in the centre and periphery, allowing the posterior portion of the iris to penetrate into the openings. The central perforation completely severed the lens, the iris-tissue extending and adhering to the cataractous posterior capsule. The other eye was cataractous, but had no perforation. The author believes that these conditions followed an injury to the foetus shortly before birth. Jackson and Schneideman, of Philadelphia, ²¹²⁹_{V. 1, No. 1} record a series of cases in which the capsule of the lens was either accidentally or intentionally opened, a study of which seemed to demonstrate that perforation of the capsule and disturbance of lens-substance may be followed in the human eye, as in the eyes of lower animals, by permanent healing without opacity or with opacity strictly and permanently limited to the part directly injured, and this may occur in the adult up to middle life. Wounds capable of such healing must be linear in shape or quite minute and aseptic, but with such wounds favorable results may be obtained frequently enough to make it the duty of the surgeon to recognize their possibility and to give patients every chance of attaining them. The proper treatment to secure this end is rest of the eye, including complete atropinization, to be maintained until the healing is complete, but not necessarily bandaging or persistent exclusion of light.

Rothschild, of Paris, ⁷⁸_{Mar., '95} has seen absorption of a localized opacity in a lens that had been provoked by the entrance of a particle of iron into that body. The foreign body remained imbedded in the lens and a resultant vision of 0.5 was obtained. Four cases of spontaneous luxation of the lens, two of which were congenital, have been reported by Armaignac, ¹⁸⁸_{June 23, '95}. In one the luxation was bilateral. In three instances the lens had to be extracted, after years of quiet, upon account of violent glaucomatous attacks.

Weisz, of Budapest, ¹⁷¹_{Apr., '95} has seen two cases of congenital subluxation of the lens,—one in a boy of 15 years, without other lesions, and the other in a girl of 21 years, who, in addition, had iridderemia with the lens cataractous and fixed above. In removing

a lens dislocated into the anterior chamber Mackay⁶_{Aug. 10, '95} favors the employment of a needle to fix and remove the lens from the path of the knife while making the corneal section and prevent its falling back into the vitreous while a vectis, or scoop, is being passed behind it.

In a case of secondary glaucoma from partial dislocation of the lens into the anterior chamber, removal of the lens by Oliver, of Philadelphia,²¹²⁹_{V.I.P.1} was followed by immediate cessation of all pressure symptoms. In this case the lower half of a densely cataractous lens had pushed its way through the pupillary opening and had pressed the iris in this position far back behind it. To effect its removal a peripheral incision was made in the lower outer third of the cornea. A wire loop was introduced and the lens was extracted without the loss of any vitreous, obtaining a clear and round pupil.

A case has been reported by Lagrange, of Bordeaux,¹⁸⁸_{June 30, '95} in which spontaneous luxation of a cataractous lens into the vitreous was followed by all the symptoms of cyclitis. Vision was reduced to counting fingers at one metre, but returned to normal after extraction of the lens.

From an experience with twenty-four consecutive cases of ripening of immature cataract, Bettman, of Chicago,¹⁰¹⁸_{Jan., '95} deduces the following conclusions: 1. Artificial ripening of cataract is demanded in properly-selected cases. 2. Direct trituration is preferable to other methods; it is easily performed by one possessing ordinary skill. 3. It is not followed by any untoward symptoms, consequently it is a safe and reliable procedure. 4. It is not indicated where sclerosis involves the bulk of the lens. 5. It is especially useful in senile cataracts with soft cortex. 6. The results of the massage are marked and rapid. 7. Maturity of the cataract is usually induced in three weeks, often sooner. 8. Very little discomfort is caused the patient aside from bandaging the eye for two days. 9. At the subsequent extraction of the lens the cortical substance is readily removed and dangers of iritis and supuration of the corneal wounds are lessened. From the results obtained in a short series of cases of direct trituration for immature cataract, Pipino, of Des Moines,⁵⁹_{Feb. 2, '95} considers the operation, in suitable cases, to be free from danger. He usually allows four to five weeks to elapse before performing extraction.

In cases of traumatic cataract with rapid swelling of the lens, Ball, of St. Louis,¹⁰¹⁸_{Jan., '95} advises extraction of the lens through an incision with a Graefe knife within the corneo-scleral junction and involving from one-third to three-fifths of its circumference. The extent of the incision is of little importance if the operation is

done aseptically, the chief merit of the method being the avoidance of the valve which is produced by the linear method. An iridectomy is not performed.

In operating for cataract, Pagenstecher, of Wiesbaden, ³⁵³_{Nov., '94} gives the following advice to young ophthalmologists: 1. A slight febrile state counter-indicates the operation. 2. All sources of infection in the adnexa must be excluded before operative procedure. 3. The operation should never be performed if the fellow-eye is at all inflamed or enucleation of the sympathizing eye be demanded; the extraction should be postponed for from six to eight weeks, for sympathetic irritation can become a sympathetic inflammation as the result of the trauma of the operation. 4. Only ripe cataracts should be chosen. 5. The strictest antiseptics should be maintained, bichloride of mercury (1 to 5000) being employed in all stages of the operation. 6. After properly opening the lids with the speculum the incision should be made in the corneo-scleral junction, not too peripherally above, the conjunctiva flap being aimed at. A narrow Graefe knife is best suited for this purpose. 7. Iridectomy should be performed in all cases. 8. The capsule should be divided by the cystotome in all directions, peripheral opening of the capsule being deprecated. 9. The lens is to be delivered from the wound by counter-pressure upon the lid above and especially below. 10. Washing the anterior chamber should not be undertaken. 11. Should prolapse of the vitreous occur, the lens should be removed with the scoop. 12. A bandage should consist exclusively of sterilized material. 13. The secondary needling operation should be performed as soon as the eye is free from irritation. 14. In this operation the needle should be made to enter the cornea as near the sclero-corneal junction as possible. Certain modifications of these principles are permissible in the hands of more skillful operators, but Pagenstecher prefers the simple operation in many instances.

Van den Bergh, ⁹⁹⁶_{Dec. 10, '94} believes that the best operation in congenital cataract is simple linear extraction, as the anterior capsule is often covered with calcareous deposits.

In congenital nuclear cataracts with transparent periphery, Lagrange, of Bordeaux, ¹⁴_{Sept. 22, '95} suggests splitting the upper part of the iris vertically,—a straight pupil being thus produced, acting like a stenopaic slit.

In cases of lachrymal disease which do not subside under the ordinary form of treatment prior to operating for cataract, Blumenthal, of Riga, ²¹_{Apr. 27, '95} closes the canaliculus by the thermo-cautery, as suggested by Haab, of Zürich. In performing cataract operation, Lal Madhub Mukerji, of Calcutta, ⁶_{Feb. 9, '95} after adopting preliminary

antiseptic methods and having had the pupil dilated with atropine, makes a corneal section occupying one-third of the membrane and so completed that the edges of the section come directly together. The lens is then delivered by pressure applied with the curette to the sclera just below the sclero-corneal margin. An iridectomy is made if the pupil has not responded sufficiently to the atropine, if the lens is hard and large, if there are adhesions of the iris necessitating the use of a vectis, or curette, if the iris be accidentally injured, or if the patient is incapable of enduring the quiet that is indispensable to the prevention of prolapse.

Gimlette ^{Feb. 2, '95} states that his most successful cases have been those in which the lens was extracted in its capsule without any iridectomy. The next in order of success was extraction in the capsule with iridectomy, while the poorest results were obtained by a laceration of the capsule without iridectomy. He has abandoned the last method. Maher Chund favors extraction in the capsule without iridectomy and through an inferior section. The advantages claimed for the lower incision are greater facility, less risk of escape of vitreous, and the fact that it is free from the danger of gaping of the wound, which results in the upward flap from spasm of the superior rectus muscle. Bamber advocates the use of bichloride of mercury 1 to 2000 for cleansing the instruments and the eye, and the use of a powder of boric acid and iodoform dusted into the eye after the operation. Fink has found that in from 1- to 2-per-cent. of extractions the patient is unable to count fingers immediately after the operation, and that this is due to a deep-seated opacity in the hyaloid membrane, densest at the centre, calling for division with a cystotome.

In operating for cataract, after complete dilatation of the pupil with atropine, Love, of the City of Mexico, ^{1007 July, '95} makes the corneal and capsular incision in the following manner: A narrow knife is passed through the cornea, midway between the horizontal and vertical meridians to the pupillary edge of the iris. The handle is then raised up and out from the face, so that the blade dips into the edge of the lens-capsule, through which it is gently passed, and then out and over the edge of the iris. The handle is then lowered and the corneal and capsular incision is finished. He rarely performs iridectomy. Lens-matter which cannot be removed with a fenestrated scoop is washed into view with sterilized boric acid, from a pipette, when, with the same instrument, it is sucked out. At the time of the operation eserine is instilled, and atropine is employed on the third or fourth day. Both eyes are lightly bandaged. After the oblique section the edge of the lid moves over the part almost at right angles to the

section, and finds no edge or unevenness to catch upon and thus break up adhesions and produce wrinkling of the capsule. The operation is usually performed in the surgeon's office and the patient is permitted to depart at once. Kalt, of Paris, ²⁷⁴_{Oct., '94} sutures the cornea by entering a fine, sharp, curved needle, threaded with very fine silk, through the superficial laminæ of the cornea, one millimetre from the limbus above, and bringing it out at the limbus. The needle is then re-entered into the episcleral tissue one millimetre beyond. The corneal section is made, care being taken to avoid cutting the thread. After the lens is delivered the suture is carefully tied, any traction on the lower, or corneal, end being avoided. This procedure gives rise to no reaction and has no ill effects. In fifty extractions where this method was employed there were only three incarcerations, as compared with 8 per cent.,—which is the lowest record of the author in cases where the suture was not inserted.

Taylor, of Nottingham, ¹⁷¹_{Feb., '96} pronounces himself in favor of extraction without iridectomy. Leplat ²⁹³_{July, '95} prefers extraction with iridectomy and employs Graefe's scleral section, the advantages of the simple method being overbalanced by its disadvantages.

Terson, of Paris, ¹⁷¹_{July, '95} exhibited to the Société Ophthalmologique de Paris the knife used by Pellier de Quengsy for cataract extraction in the eighteenth century. The knife was narrow and curved, with the cutting edge on the convex side. Utilizing the principle of this knife, Terson has for two years employed in his cataract extractions a knife of the same length as the Graefe knife, with a convex cutting-edge and a sharper point. The principal advantage claimed is that its curvature renders the cutting of the iris impossible.

Nanavatta, of Ahmedabad, ²³⁹_{Aug. 16, '95} has the pupil contracted to a pin-point previous to the operation and lacerates the capsule while making the corneal section. He has found that the use of eserine permits of performing a very clean iridectomy. After the operation, atropine is instilled.

Kalt, of Paris, ²⁵⁴_{Dec., '94} has reduced the danger of prolapse of the iris to 4 per cent. by having recourse to a corneal suture following cataract operations. The author introduces a small, sterilized, sharp needle, threaded with fine silk, one millimetre below the limbus corneæ in its vertical meridian, and brings it out at the limbus and re-introduces the needle one millimetre above in the episcleral tissue, leaving a loop between the stitches. (See cut on next page.) The incision with Graefe's knife is made in the cornea in the space left free by the thread. After extraction the stitch is drawn tight and allowed to remain for ten days.

Nuel, of Liege, ²⁹³_{July, '95} does extraction without iridectomy, unless indicated, and raises a small conjunctival flap above, to lessen the danger of prolapse. While making the corneal section, Taylor, of Louisville, ¹¹⁶³_{Aug., '95} fixes the globe by grasping the conjunctival and episcleral tissues with the forceps close to the sclero-corneal margin above the cornea. This is done in order that the sclero-corneal margin may, by making traction on the forceps, be raised above the iris in case that it should float in front of the knife while the corneal section is being completed. Bettman, of Chicago, ¹¹⁵_{Aug., '95} gives the notes of eleven cases of cataract operated upon under atropine and with a peripheral incision, the cases demonstrating that good results are obtained no matter where the corneal incision is placed, and also showing, according to him, that the employment or non-employment of eserine, atropine, and cocaine does not effect the occurrence of prolapsed iris. The most important factors in securing an ideal result are the after-treatment and the



CORNEAL SUTURE AFTER CATARACT OPERATIONS. (KALT.)

Archiv für Augenheilkunde.

observation of methods which will counteract intra-ocular tension and thus rapidly lead to reunion and firmness of the corneal wound. In washing out the anterior chamber in thirty cases of extraction, Chibret, of Clermont-Ferrand, ¹⁷¹_{Feb., '95} employed a syringe that is similar to the one used by Ancl. He believes that cortical matter can be readily removed by this method.

Burnett, of Washington, ⁸¹_{July, '95} holds that a surgeon is never justified in introducing an instrument into the eye for the delivery of a cataract, as he believes that proper manipulation will succeed in every case where delivery is possible. The same author reports an instructive case of panophthalmitis following extraction in a colored man who had had a successful operation performed on the fellow-eye. Twenty-three days after a successful operation the patient returned with the edges of the wound infiltrated and pus in the anterior chamber. Notwithstanding the most active treatment, the inflammation went on to destruction of the eyeball. Gasparini, of Siena, ³⁰_{Oct., Nov., '94} reports a case of double cataract extraction followed by hæmorrhage, with subsequent restoration of vision. The patient was 71 years old, and in a very poorly nourished con-

dition. The right eye was operated upon by a simple extraction. Iridectomy was rendered necessary, however, by prolapse of the iris. Hæmorrhage came on several hours later, and, in spite of compresses of cold sublimate, it recurred several times in the next ten days. The fellow-eye was next operated on and, three hours after the operation, hæmorrhage supervened, with prolapse of the internal coats of the eye through the wound. The eye was treated aseptically. The prolapse reduced itself and the eye healed. Six weeks after the operation vision was found to equal $\frac{2}{30}$ with a + S. 15 D. The author thinks that the hæmorrhage was not due to increased tension, but that it depended upon an alteration in the vascular system, especially in the veins. The patient was a sufferer from varicose veins over the whole body and exhibited other evidences of vascular disease.

It has appeared to Schneideman, of Philadelphia, ⁷⁶_{July, '95} that after cataract extraction the upper part of the pupil is clearer than the remaining portion, and he believes this to be due to the fact that the capsule is more thoroughly lacerated and cleansed of its cortical contents in its upper portion, by reason of the incision in that portion of the capsule and the mechanical action of the upward-passing lens during its delivery. He thinks that the same condition might be secured for a more centrally situated area by making the first incision in the capsule at a point lower in the pupil in an horizontal direction, the upward flap being made with a knife from above downward. Kirk, of Glasgow, ⁶_{Oct. 8, '94} reports the successful removal by Fergus of a cataract of thirty-one years' duration from a woman, 72 years of age, suffering from myxœdema. Earlier operation was rendered impossible owing to the swollen condition of the lids.

Fernandez, of Havana, ¹⁷¹_{Feb., '95} reports seven cases of delirium occurring after cataract extraction, in all of which the cause of the symptoms was different. It was found to be usually dependent upon closing the eyes, nostalgia, age, moral impressions, alcoholism, etc. Dujardin ²¹²_{Dec. 10, '94} reported a case of delirium tremens immediately after cataract extraction, ending in death on the fourth night. The author reviews the literature of such cases and insists upon a rigid inquiry into the general condition of the patient. He does not attribute all cases to alcoholism.

After the performance of cataract operations, Walter, of Odessa, ²⁵⁴_{May, '95} does not darken the room, desiring sunlight, which is so necessary to purify the atmosphere of an overcrowded room. As a protection after removal of the bandage, the patients are given smoked glasses.

In a case in which the corneal flap was found completely

everted three days after simple extraction, Trousseau, of Paris, ¹⁷¹_{Mar., '96} succeeded in retaining the flap in its position after the insertion of a corneo-scleral suture. An ultimate vision of $\frac{1}{8}$ was obtained.

On the second day of a cataract extraction complicated by dacryocystitis Evetzky and Berestnew ³_{July 3, '95} noted a yellowish-white exudate in the iris, which soon filled the anterior chamber. The cornea remained clear. On the sixth day the eye was enucleated and all of its tissues were found to be inflamed, but no pus was present. Inoculations gave almost pure cultures of the bacillus salivarius septicus. The same germs were found in the lachrymal sac and mouth of the patient, and gave rise to a similar ocular process when inoculated into the anterior chamber of a rabbit. Lee, of Liverpool, ¹⁵_{June, '95} has had intra-ocular hæmorrhage, with subsequent shrinking of the globe, following cataract extraction in a woman, 78 years of age, with degenerative heart disease. The patient died about eight months later from angina pectoris.

In performing the operation of discission, Nicati, of Marseilles, ¹⁷¹_{Dec., '94} employs a very delicate knife with a triangular point and a blade one millimetre in breadth. Knapp, of New York, ²⁵⁴_{Dec., '94} thinks that glaucoma, which arises after the discission of secondary cataracts, may be often avoided by the instillation of eserine after the operation. Should this procedure fail, iridectomy is a reliable curative procedure. Wicherkiewicz, of Posen, ¹⁷¹_{May, '95} describes an operation which he calls "anterior scleronyxis," and which he prefers to discission in simple secondary cataract without any adhesions of the iris. It consists in making a puncture with a Knapp knife in the limbus, one millimetre in front of the iris, instead of in the clear cornea. The object is to avoid the chances of infection, as scleral wounds are less liable to infection than corneal.

In a record of personal experience in the extraction of cataract, Derby, of Boston, ⁹⁹_{Jan. 31, '95} states that the absence of perfect ripeness invariably diminishes the chances of success, and that, with favorable conditions, the percentage of successes should reach 85 per cent., with total loss of the eye in 2 per cent. Corrosive sublimate 1 to 5000 is used as an antiseptic in preparing the patient, the instruments being dipped in boiling water, with the exception of the fixation forceps, which are immersed in alcohol (the author employing forceps with rubber tips). The corneal cut is made in the sclero-corneal junction, the section including one-third of the periphery and being completed without a conjunctival flap. A small iridectomy is made and the capsule is incised in different directions. Expulsion of the lens is secured by pressure applied to the base of the cornea through the lower lid, and any

remaining cortical is coaxed out by massage of the lid. Eserine is instilled and both eyes are bandaged. The bandage is removed daily and the lids are bathed, but not separated for inspection of the eye until the eighth day, unless previously indicated. The patient is confined to bed for twenty-four hours.

Story, of Dublin, ¹⁶_{July, '96} presents the method pursued and results obtained in 100 consecutive cases of extraction, 42 of which were simple and 46 combined operations. Among the first class there were 3 failures, 2 of which were due to wound-infection and 1 to opacities in the vitreous. One failure followed preliminary iridectomy and resulted from detachment of the retina. Of the 58 cases in which iridectomy was made, 86 per cent. were successes with a vision of $\frac{6}{18}$ or upward; whereas there were 90 per cent. of successes in the simple series, 54 per cent. of which had vision of $\frac{6}{18}$ or upward. Prolapse of the iris occurred five times, and was successfully treated by excision and cauterization. The author has returned to the conjunctival flap, believing that it affords important advantage in sealing up the incision.

Two hundred cases of extraction performed at the Kashmir Mission Hospital have been analyzed by Neve. ³⁶_{Nov., '94} In 24 preliminary iridectomy was performed. In 33 instances simple extraction was chosen and in 3 cases prolapse of the iris occurred; in 8 the upper part of the iris became adherent to the corneal cicatrix and in 2 there was no improvement in vision owing to a blocking of the pupil. The results were 184 successes and 11 failures (6 left the hospital, of which 2 were probable failures). Of the 11 unimproved cases 4 resulted in panophthalmitis, 2 in blocked pupil, 3 in iritis, and 2 in optic atrophy.

Ring, of New York, ⁵⁹_{Feb. 23, '96} has made a study and a comparison of 1032 cases of combined extractions and 1123 cases of simple extractions with the following results:—

	Number of Cases.	Prolapse of Vitreous, Per Cent.	Average Vision with Prolapse.	Incarceration of Iris, Per Cent.	Prolapse of Iris, Per Cent.	Iritis, Per Cent.	Suppuration, Per Cent.	Dissection, Per Cent.	Perfect Successes, Per Cent.	Partial Successes, Per Cent.	Failures, Per Cent.	Average Vision.
Average (simple).	1123	4.27	0.29	4.00	8.66	11.82	1.30	33.04	90.82	6.30	2.88	0.48
Average (combined). . . .	1032	7.23	0.23	4.82	. . .	13.15	1.91	27.61	88.08	7.45	4.47	0.34

The author believes self-inflicted traumatism, consciously or unconsciously, to be the most frequent cause of prolapse of the iris. Toward prevention he advises freeing the section from all

foreign matter, such as bits of cortical or lens-capsule, etc.; making corneal section and iridectomy when necessary, and giving rest and quiet for the first forty-eight hours. If the eye is opened within two days the patient should not be allowed to look down. Eserine or pilocarpine should be instilled immediately after the operation. From the statistics and from personal experience the author feels justified in maintaining that the simple method of extraction is far superior to all others in the very great majority of cases, and that, while it is a somewhat more difficult operation than the combined method, any experienced surgeon will find the results proportionately greater.

Weeks, of New York, ¹⁰⁰⁷_{July, '95} gives the results obtained in the extraction of twenty-five cases of immature, senile, and some forms of zonular cataract. In thirteen instances vision equaled $\frac{2}{3}$ or better, and in the remainder vision equaling $\frac{2}{7}$ or better was obtained. The operation performed in all uncomplicated cases was simple extraction. The author has never seen inflammatory conditions awakened by the presence of cortical substance in the eye after removal of immature cataract.

Ellet, of Memphis, and Parker, of Detroit, ²¹²⁹_{V.1, P.1} generalize the methods employed in the operation and after-treatment of cataract cases during their terms of service (one year each) in Wills Eye Hospital. They found that the average vision obtained in the simple extractions equaled $\frac{2}{5.3.4}$, while that for the combined equaled $\frac{2}{6.5.3}$, and that in the combined operation where irrigation of the anterior chamber was employed the average vision equaled $\frac{2}{5.0.6}$, and where not employed it equaled $\frac{2}{9.0.2}$. Better average vision was obtained after simple extraction where irrigation was not used. Prolapse of the iris occurred in 16.4 per cent. of the simple extractions, but apparently did not lower the average vision. The best average vision ($\frac{2}{5.0.6}$) was obtained by the employment of the combined operation with irrigation of the anterior chamber.

An eye in which the couching operation for cataract had been performed in India thirteen years previously has been examined by Barrett, of Melbourne. ²⁸⁵_{Aug. 20, '96} Vision was "perfect," and the eye was perfectly comfortable with the exception of occasional attacks of pain in the region of the supra-orbital nerve and a troublesome epiphora. Weeks, of New York, ¹_{Aug. 3, '95} reports one hundred consecutive extractions. In all cases except in cataract with glaucomatous tension, where the pupillary margin is free, and in some cases even where a few posterior synechiæ exist, he prefers extraction without iridectomy. He follows Knapp in the manner of making the capsulotomy, and has resorted to discission in 88 per cent. of his private cases and in 60 per cent. of his hos-

pital cases, the operation being performed about three weeks after extraction. He frequently resorts to cauterization of the corneal wound made by the knife-needle. He states that he has yet to regret the extraction of an immature cataract. In seventy-seven cases of extraction with iridectomy, Lagrange, of Bordeaux,⁷⁰ July 28, Aug. 11, '95 has had only four relative and no absolute failures.

Diseases of the Choroid.

Wiegmann, of Berlin,³⁵³ Nov., '94 cites an instance of senile chorioretinitis of the macular region. The entire fundus was dotted with a large number of yellowish-gray round spots of different sizes. The larger ones occupied the macular region, while the smaller ones were found in the peripheral zone. The visual fields were normal. The author has observed the disease in but two instances.

A case of exudative choroiditis associated with a pediculated, polypoid, granulative tumor of the choroid, which appeared clinically as a glioma exophyptum, has been reported by Ginsberg, of Berlin.¹⁹⁰ Nov., '94 The eyeball, which was hard, was removed from a 3-year-old child. A greenish-yellow reflex was obtained from the globe. The iris was pushed forward in contact with the cornea. Microscopically the growth was found to have resulted from an exudative choroiditis which had led to retinal detachment and choroidal atrophy, as well as to a marked proliferation of the pigment-epithelium and to the formation of a growth that was provided with several pedicles. This neoplasm had broken through the lamina vitrea and projected into the interior of the globe. Trousseau, of Paris,²⁷⁴ Oct., '94 has reported a case of purulent iridochoroiditis in a man who had stricture of the urethra. The author thinks that the ocular condition was infectious in origin.

A rare case of endothelial sarcoma has been seen by Parisotti, of Rome.¹⁷¹ Aug., '95 The trouble began as a slight hyperæmia of the right eye, lasting a month. Four days after this had disappeared a mist appeared before the eye, followed by progressive loss of vision. A few months later pain ensued; this gradually grew more intense and became associated with glaucomatous symptoms necessitating enucleation. A tumor was found at the posterior pole of the eye, adhering to the sclera. In front of the growth a portion of the choroid was normal and free from adhesions. Toward the ora serrata the choroid was covered with a substance forming a gray ring. The retina showed a complete funnel-shaped detachment. A section through the thickest portion of the tumor showed that it was limited by a band of pigment. The cells composing this band were of various forms, and were for

the most part degenerating. The mass of the growth was composed of a net-work of fibrous tissue, the meshes being of various sizes and containing cells of endothelial type crowded against one another. Very few of these cells contained pigment. Blood-vessels could be seen only in the external layers of the growth. A section through the choroid near the ora serrata showed that the grayish layer upon it was the first step in the formation of the tumor. It was formed of heaped-up cells of endothelial type, some of which were already infiltrating the layer of pigmented epithelium. The optic papilla was also invaded by the growth, the retina being fairly preserved near the nerve, but farther forward it was transformed into connective tissue. The anterior segment of the eye showed inflammatory changes. The cells of the growth exhibited hyaline degeneration throughout.

Hippel, Jr., of Heidelberg, ²⁰¹_{B 40, H. 4} made a microscopical study of two eyes in which there were recurrent hæmorrhages occasioned by a melanosarcoma of the iris and choroid. The tissues of both eyes were found to be disorganized. An ossification of the choroid had occurred in one of them. The clots contained a colloid substance which gave a reaction that was characteristic of amyloid material. The author thinks that this was due to a transformation of the fibrin, and was analogous to the starch-corpuscle found by Friedreich in pulmonary hæmorrhages. Story and Graves, of Dublin, ²_{June 1, '96} give the notes of three cases of intra-ocular sarcoma. The first was seen in a woman 33 years of age. The growth sprang from the outer part of the choroid and had perforated the sclera. The patient lived in good health for ten years after enucleation of the eye, and died with symptoms of secondary involvement of the liver. The other two cases were observed in males and originated at the corneo-scleral margin. All the growths were pigmented in only a portion of their extent, and were formed mostly of spindle-cells. A case of sarcoma of the choroid, in a man 76 years of age, has been reported by Buller, of Montreal. ²⁸²_{Dec., '94} The patient claimed that the eye was unaffected previous to a slight injury received about eight months before. There was total detachment of the retina with slight pericorneal injections and only very slight increase in tension. The iris was vascular, and the pupil failed to dilate under the use of either atropine or scopolamine.

Carpenter, of London, ⁵¹_{Jan., '95} gives notes of several cases of tuberculosis of the choroid. The lesions are excessively protean in their characteristics. They are, however, not necessarily situated in the neighborhood of the disc, and may occur even in the periphery of the fundus.

Diseases of the Vitreous.

A case in which numerous hæmorrhages into the vitreous humor recurred monthly, ceasing with the establishment of menstruation, is reported by Pressel, of Zuffenhausen,¹³³ in a 16-year-old girl. Signs of hereditary syphilis, which became apparent in both eyes some time after, disappeared under mercurial inunctions. Abadie, of Paris,¹⁴ July 16, '95 has seen normal vision reduced to light-perception by a hæmorrhage into the vitreous following a burst of anger. The author claims to have obtained an improvement in vision by introducing a needle which was connected with a galvanic battery into the vitreous.

Terson, of Paris,¹⁷¹ Nov., '94 extracted a small leaden shot from the vitreous by means of a small forceps constructed especially for that purpose and provided with two long arms terminating in two small scoops.

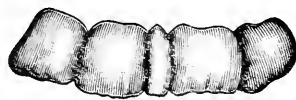
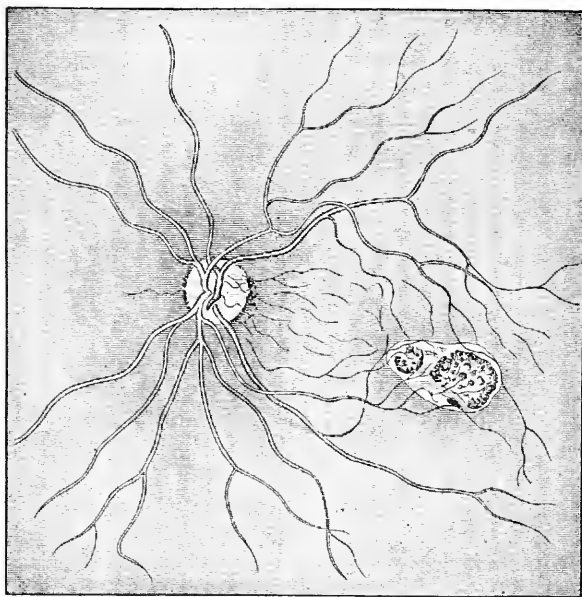
Diseases of the Retina.

From the results of experiments, Fuchs, of Vienna,⁵⁷ Aug., '95 states that the erythropsia of normal eyes as well as of eyes deprived of their lenses is caused by dazzling, which need not be disagreeably strong, but must be of long duration. Exposure to sunlight reflected by snow is the most effective means of producing it, but for most normal eyes it is necessary that this take place at a certain height above the level of the sea, the sunlight there being stronger and richer in short rays. The production of the phenomenon is facilitated by dilatation of the pupil and still more so by the absence of the lens. This structure protects the retina by rendering the light passing through it poorer in short rays, which is especially the case when the lens grows yellow by age. By its fluorescence it converts short-wave rays into those of greater length. That the erythropsia has its origin in the retina he considers proven by the fact that, if only one eye be exposed, the disturbance limits itself to this eye, and that it may be unequal in different parts of the field, according to the different degrees of dazzling. He is inclined to explain the condition by the supposition that the retinal purple becomes visible.

Posey, of Philadelphia,¹¹² Nov., '94 observed the association of a partial coloboma of the macular region with a supernumerary tooth in a man 25 years of age. The left eye presented the anomaly, which was situated two and one-half discs' diameter down and out from the disc and had an oval form with its long axis at an angle of forty-five degrees. The appearance of the coloboma gave the impression that all of the coats of the eye had not been involved. The author views the case as one of partial

coloboma of the eye in which the pigment-layer of the retina was alone disturbed. The accessory tooth was in the median line of the upper jaw, somewhat obliquely placed between two well-developed incisors, and did not project anteriorly or posteriorly. (See illustrations.)

A case of embolism of the central artery of the retina, exclusive of the temporal branches, is reported by Laqueur, of Strassburg,²⁵⁴ in the left eye of a 20-year-old girl. The field was



COLOBOMA OF MACULAR REGION AND SUPERNUMERARY TOOTH. (POSEY.)

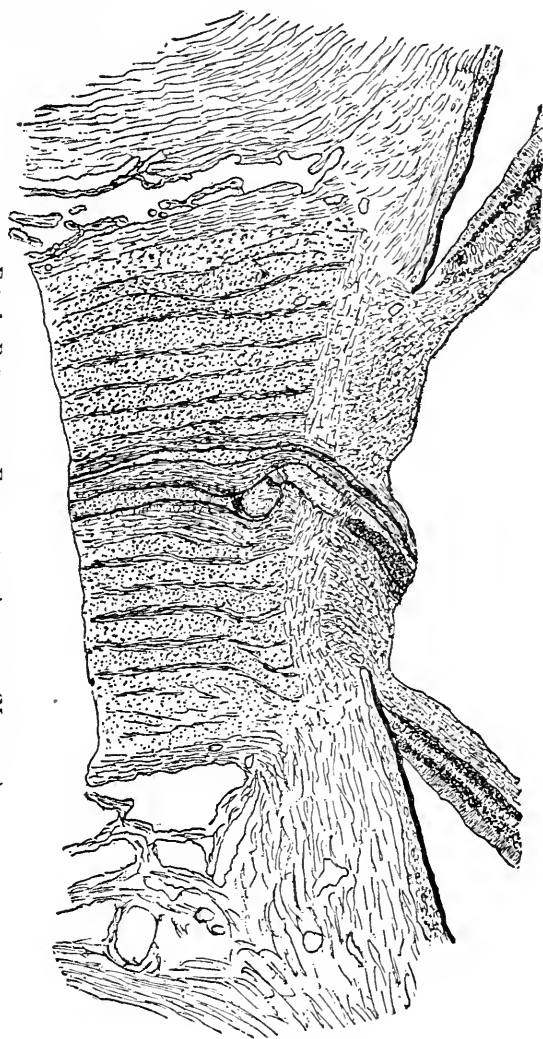
University Medical Magazine.

contracted above close to the fixation-point, below to 6 degrees, to the nasal side 4 degrees, and to the temporal side 12 degrees. The central vision was $\frac{2}{3}$, but, later, a normal visual acuity showed the macula to be well nourished. The temporal artery arose from the central artery at a point situated posteriorly to the position of the deposition of the embolus. The author thinks that the visual and pupillary fibres are separate and that the pupillary ones possess the greater vitality.

Marple, of New York,¹¹⁷¹ has made a careful study of a

case of embolism of the central artery, occurring in a woman aged 56 years, seen in Gruening's practice. The eye had been enucleated for intercurrent glaucoma. The embolus measured one-seventh millimetre in length and one-ninth millimetre in

FIG. 1.—POSITION OF EMBOLUS IN ARTERY. (MARPLE.)
New York Eye and Ear Infirmary Reports.



diameter, and, as can be seen in the illustration (Fig. 1), was situated immediately behind the lamina cribrosa, where it had been stopped by a sharp bend in the vessel. As shown in the second figure, the clot was hyaline in appearance and contained a few nuclei. The nerve (Fig. 3) showed intense interstitial neuritis

with complete atrophy of the nerve-fibres, and the intervaginal space was markedly dilated. The intima of the artery was hypertrophied, but the smaller vessels showed no decided changes. There were no apparent alterations (see Fig. 4) in the pigment-layer or in the layer of rods and cones of the retina, but in the ganglion-layer the cells had entirely disappeared, only a few nuclei remaining. The fibre-layer showed no fibrillation except near the papilla, but on both sides of the disc it was thickly infiltrated with cells and markedly œdematous. The iris was atrophic and the iris-angle was closed.

The accompanying chromo-lithograph depicts the late ophthalmoscopic appearances in a case of supposed embolism of the

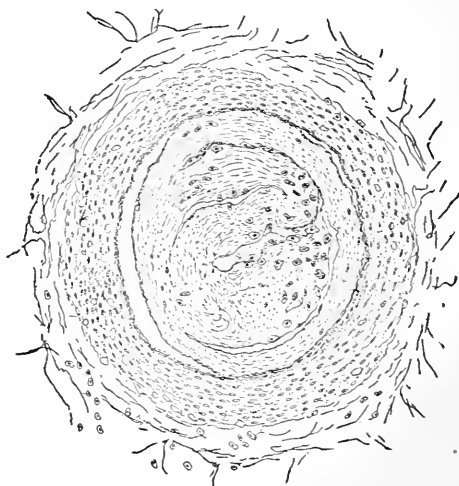


FIG. 2.—APPEARANCE OF CLOT IN VESSEL. (MARPLE.)

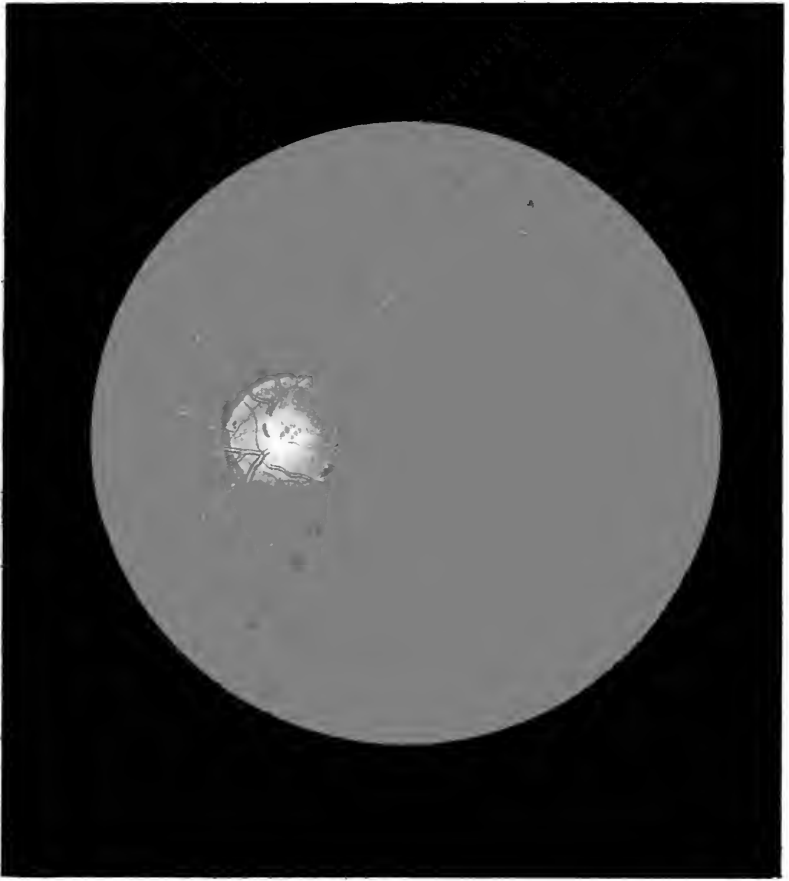
New York Eye and Ear Infirmary Reports.

central artery, seen by Oliver, of Philadelphia, ⁴⁵¹_{Jan., '95} in the service of Harlan, of the same city. The patient, a man 64 years of age, when first seen gave a history of two attacks of sudden loss of vision occurring within three days, followed, two days later, by spontaneous periodical attacks of dimness of vision and blindness. The appearances were those of embolism. In seven months' time the fundus-changes (as shown in the plate) were those of optic-nerve atrophy, gross perivasculitis, and retinal degeneration.

Goode, of Cincinnati, ¹⁰¹⁸_{Jan., '95} observed a case of embolism of the central retinal artery, in a man 36 years of age, with mitral regurgitation. The ophthalmoscope showed a bulbous distension of the artery. The veins were unaltered in size.

Bouvin, of La Haye, ¹⁷¹_{Mar., '95} has seen an instance of partial

LEFT EYE



Late Ophthalmoscopic Appearances of Supposed
Embolism of the Central Retinal Artery. (Oliver)

International Medical Magazine



embolism of the central artery affecting two branches, running down and out from the disc. Massage was followed by a disappearance of the signs of stasis in the lower vessels. Vision

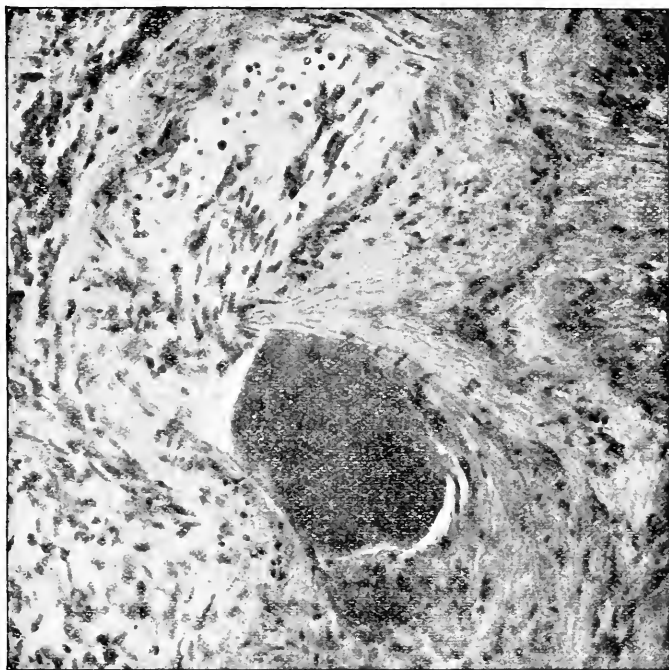


FIG. 3.—CONDITION OF OPTIC NERVE. (MARPLE.)

New York Eye and Ear Infirmary Reports.

increased from $\frac{3}{60}$ to $\frac{4}{24}$, and in four days had returned to $\frac{5}{6}$. A slight narrowing of the field alone remained.

A case of primary recurrent retinal hæmorrhage in a 19-year-old male is recorded by Henry.³² During a period of ten days

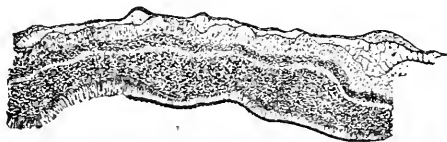


FIG. 4.—CONDITION OF RETINA. (MARPLE.)

New York Eye and Ear Infirmary Reports.

previous to being seen by the author, the patient had had repeated attacks of dim sight lasting about half an hour. There was a retinal hæmorrhage below the disc and a large vitreous opacity.

Three months later there was a fresh hæmorrhage to the outside of the disc. The patient was troubled with epistaxis and poor circulation.

A case of thrombo-phlebitis of the central retinal vessels of the left eye has been observed by Würdemann, of Milwaukee, ²⁴⁹_{Oct., '94} in an apparently healthy boy 8 years of age. The optic disc and surrounding retina were apparently filled with suffused blood. There were isolated hæmorrhages in the fibre-layer of the retina and a star-shaped one at the fovea. The arteries were constricted and were lost to view at the border of the disc. The veins were much enlarged with peculiar sausage-shaped dilatations. The nerve became atrophic and the arteries were reduced to white streaks, while the veins contained in places clotted blood. One year later glaucomatous symptoms supervened and the ophthalmoscope showed a connective-tissue formation in the vitreous near the posterior surface of the lens, with quite narrow bands extending into other parts of the vitreous. The eye was enucleated. Microscopical examination showed that the interstitial connective tissue in the optic nerve had markedly increased. The nerve-fibres were becoming medullary and varicose. The walls of the perivascular spaces were thick, and these, together with the lymph-spaces around the separate nerve-fibres, were occluded. The arteries were completely occluded by a fibrous clot containing a granular mass of degenerated red and white blood-corpuscles, which extended for a distance of five millimetres from a point one millimetre anterior to the lamina cribrosa. The veins contained clots. There was marked thickening of the adventitia in both series of vessels; the intima and the membrana limitans of the retina seemed everywhere intact.

Holden, of New York, ²⁴⁹_{Apr., '95} reports several cases of striated affections of the retina. The first was an instance of angioid streaks in a woman aged 43 years. In both eyes there was an irregularly outlined zone about the disc in which the retina was somewhat opaque. In the macular region there was disturbance of pigmentation with small, scattered hæmorrhages, dark spots, and superficial, bluish-white, membranous patches. Radiating from the semi-opaque area a system of branched striations of dark-brown color, having each about the width of a vein on the disc and lying beneath the retinal vessels, could be seen. In the right eye many of these streaks were bordered on one side by a light streak that was double the width of the striation. Down and out from the disc was a large, bright-red, irregular-branched hæmorrhage, which, while undergoing absorption, was seen to develop a short, dark-brown, branched streak that was bordered on one side by a

broadest light streak. Later the blood collected at the upper margin of the hæmorrhage and new streaks formed. In the temporal periphery of the same eye there was a patch of opacity giving off similar streaks. The notes of three cases of striated retinitis are given, a study of which reveals a striking similarity in the course and conformation of the white stripes seen in this affection, the pigmented angioid streaks, and the patches of opacity or of pigmentation of the retina. The author deems it warrantable to assume, as a tentative hypothesis, that these affections can arise through the elements of peripheric hæmorrhages that are diffused in a linear manner in the deep layers of the retina and undergo various sorts of metamorphoses.

It is believed by Caspar, of Mulheim-on-the-Rhine, ²⁵⁴_{Apr., '96} that choriorretinitis striata, or "retinal stripes," are formed by the coagulation of the fibrin of the subretinal fluid following retinal detachment, the fibrinous material being afterward replaced by connective tissue from the underlying choroid becoming pigmented upon its edges later.

In the spontaneous formation of connective tissue in the vitreous humor with so-called retinitis proliferans, Denig, of Würzburg, ²⁵⁴_{May, '95} found anatomically a small, somewhat pedunculated swelling, two millimetres high, slightly to the outer side of the macula lutea, with numerous small hæmorrhages upon its surface. Microscopically the arteries were atheromatous, and there were numerous hæmorrhages in the retina and a large one near the tumor. The retina was œdematous and characterized by the formation of vacuoles and a great thickening of Müller's fibres. The tumor was composed of vascular connective tissue, was situated in front of the retina, and extended into the vitreous humor. The author thinks that this growth was due to the difficult absorption of repeated hæmorrhages from the retina, whose nutrition was disturbed by the atheromatous condition of the vessels.

Three cases of retino-choroidal degeneration, associated with anterior and posterior cataracts, are reported by Cutler, of New York, ²⁵⁴_{Apr., '95} as occurring in one family. In every case both eyes were affected. A large staphyloma surrounded the papilla and areas of choroidal degeneration lined with pigment and pigmented areas appeared in the periphery. In one case these conditions were associated with atrophy of the optic nerves. The author believes that these ocular changes belong to the class of retinal pigment degeneration, but that they involve the choroid to an uncommonly great degree.

According to Hirschberg, of Berlin, ⁶⁹_{June 27, '96} specific retinitis is frequently overlooked in hereditary syphilis, and should be sought

for in all cases of diffuse corneal inflammations in the early stage. It may also develop and continue after the corneal inflammation has subsided. Children, from ages of 5 to 18 months, are the most often affected, and should be treated by a thorough course of mercuric inunctions. The characteristic appearances are bright rose-colored spots in the periphery which later become converted into blanched, pigmented, or atrophic areas, and sometimes present the appearance of areolar chorioretinitis or, more rarely, of alternate concentric rings.

An interesting case of disappearance of medullated nerve-fibres in the retina, in consequence of genuine atrophy of the optic nerve in locomotor ataxia, has been seen by Wagenmann, of Jena, in a man 57 years old.²⁰⁴
B. 40, B. 4 The nerve in the right eye was grayish white, while in the left it was somewhat reddish, but gray in the deeper layers. In the left eye there was a section of medullated nerve-fibres bordering on the disc. The field in this eye was normal in extent. There was red-green blindness. Vision was reduced to one-half acuity. The field in the right eye was contracted and there was a central scotoma for color. The vision and the extent of the visual field slowly decreased in both eyes and the signs of atrophy became more marked. Ten months after the first examination the medullated nerve-fibres had disappeared. The author draws particular attention to the fact that the field became first affected in that part which corresponded to the region of distribution of the medullated nerve-fibres, and also that the disappearance of these fibres preceded the complete loss of vision in the affected part by a long interval. From this he concludes that the axis-cylinders remain active after the medullary sheath has disappeared, presupposing that only medullated nerve-fibres originally existed in that part of the retina. This disproves the supposition that the intra-ocular degenerations are the result of a descending atrophy, the conducting power of the fibres being still intact. In regard to the etiology of gray degeneration of the optic nerve, he surmises that certain poisonous substances affect similarly the nerve-centres and the nerve, the most frequent being toxins produced by syphilis in a manner similar to diphtheria. A case of retinitis pigmentosa, in a man 29 years of age, is recorded by Roy, of Atlanta.¹⁰¹⁸
Jan., '95 There was a history of hereditary eye disease, the patient's paternal great-grandmother having had poor vision with hemeralopia, and one brother and one sister being affected with the disease.

Galezowski, of Paris,¹⁷³
July, '95 believes that detachment of the retina is due to an alteration in the lymphatic channels, giving passage to the fluids normally secreted in the region of the ciliary

circle,—the organ of nutrition of the eye. When the lymphatic channels anterior to the ciliary circle are altered, disturbances take place in the cornea, the iris, the anterior chamber, and secondarily in the optic nerve (simple glaucoma). When the posterior lymphatics are altered the fluids secreted normally accumulate, infiltrate between the choroid and the retina, and produce detachment of the latter membrane. He recognizes two sets of causes,—viz. : 1. Local : (*a*) distension of the eye (myopia); (*b*) too weak attachments between the retina, the choroid, and the ciliary zone; (*c*) alterations in the walls of the capillary vessel in the nutritive region of the eye; (*d*) the exaggerated action of the accommodative muscle-fibres in the ciliary region, obstructing the circulation and favoring disturbances of secretion, especially when a general morbid disposition exists. 2. General : rheumatism, gout, albuminuria, etc. He has seen 1158 cases in which rheumatism and myopia were the chief causes. In the treatment of this condition he proposes puncture and counter-puncture of the retina and choroid with an ophthalmotome with two cutting-edges curved in the arc of a circle. The local inflammation thus produced restores the retina to its normal position. He has had two successful results. Brunner, of Cleveland, ¹⁰¹⁸_{Jan., '96} reports a case of retinal detachment involving the upper outer part of the fundus with a second detached area up and in, in which nine days later the membrane had become almost entirely re-attached in these portions, but had become detached directly below.

A case of double progressive detachment of the retina, in a girl of 12 years, is reported by Sulzer, of Geneva, ¹⁷¹_{May, '96}. It began in the left eye and soon after attacked the right, becoming slowly progressive on both sides. The vitreous humor was cloudy and the papilla and neighboring parts of the retina were sarcomatous. No cause for the detachment could be discovered. Teillais, of Nantes, ¹⁷³_{May, '96} reports a case of double retinal detachment in a child 4 years of age. The first symptoms noted were an uncertainty in gait and an undecided movement of the head, there being a tendency to incline it to one side. Ophthalmoscopic examination revealed the presence of vitreous opacities and a detachment of the retina which was more pronounced on the left side. In other portions of the fundus the retina showed the remains of old hæmorrhages. The cause was thought to have been a severe attack of whooping-cough one year previously, when there had been subconjunctival and subcutaneous ecchymoses, epistaxis, and bleeding from the right eye during the paroxysms.

Boucheron, of Paris, ¹⁷¹_{May, '96} favors early operation in detachment of the retina; puncture of the globe—in fact, any operation that

relieves tension—is advised by him. Schoeler, of Berlin ³⁵³_{Dec., '94}, states that the probable reason why Wolff was not more successful in his experiments with injections of iodine in retinal detachments was that the instrument employed by him for this purpose was not properly constructed nor correctly inserted into the eye. The author gives brief notes of five cases in which the cures by iodine injections had been maintained for six years. Wicherkiewicz, of Posen, ¹⁷¹_{May, '95} is opposed to any operative measures in detachment of the retina, while Motais, of Angers, prefers the galvano-cautery, with which he has obtained three improvements and two cures out of eleven cases.

A remarkable, though temporary, result following puncture of the sclera with a Graefe knife in a case of detachment of the retina, in a man 62 years old, has been seen by Kruedener, of Königsberg. ²¹_{June 22, '95} Vision improved from light-perception in the lower part of the field to one-twentieth. In the fellow-eye vision improved from blindness to three-fifths, falling again to two-fifths after the lapse of two weeks. Terson, of Toulouse, ¹⁷¹_{July, '95} reports the results of the use of electrolysis upon twelve cases of detachment of the retina. He has employed the methods of Abadie and of Gillet de Grandmont with some modifications. A five-milliam-père current is applied through a needle of platiniridium for one minute. Out of all the cases, which were grave, there was one cure, which was maintained for nine months, and could be attributed to nothing but the operation. Five improvements, which persisted after nine, six, three, and two months, were noted. Two cases were operated upon without result; one was aggravated and the other was an old detachment. His conclusions are: 1. That positive electricity should be used in recent detachments of the retina, and that the chances of success are greater the more recent the disease. 2. That this procedure does not interfere in any way with other means of medication suggested by the diathetic origin of the disease, and it may be useful as a palliative. 3. By clinical observation and experiment it has been demonstrated that an application of a current of five milliampères upon the eye for one minute only is entirely harmless. Straub, of Amsterdam, ¹⁷¹_{Mar., '95} has treated a case of detachment of the retina by opening the sclera at the site of the detachment and injecting a few drops of 1 to 5000 bichloride into the orbital tissues through the conjunctival wound. One week later the retina was re-attached and the visual field was nearly perfect in extent.

The notes of a case of recurrent glioma of the retina, in a boy 4 years old, are given by Ball, of St. Louis. ¹¹⁴⁴_{July, '95} Several operations for the removal of the neoplasm had been performed,

and when seen by the author the disease had progressed to such an extent as to be inoperable. The affection lasted about eighteen months. Botler, of Kansas City, ¹¹⁴_{Mar., '96} operated for glioma of the retina in a boy 3½ years old. The disease had progressed to ulceration of the tissues at the sclero-corneal junction, but there was apparently no extension to adjacent parts. The contents of the orbit were exenterated and the orbit cauterized by an applicator at white heat. Two years later there was no return of the growth. Shute, of Washington, D. C., ⁸¹_{Oct., '94} performed enucleation in the "second stage" of this affection in a boy 4 years old. The tension of the eyeball was normal. The growth was situated upon the nasal side of the right eye.

A case of gliosarcoma of the retina, occurring in a boy 2 years old, has been reported by Nattini, of Genoa. ³⁰_{Oct., Nov., '94} The eye had been blind since a few months after birth. The globe was enlarged and protruding, its movements were limited, and there was increased tension. The pupil was large and at its lower outer quadrant a yellowish nodule about the size of a pea, which covered a part of the iris, could be seen. In dissection of the globe after enucleation a reddish-yellow mass was found occupying the greater part of the cavity. This mass was semilunar in form, adhering to the sclera at its periphery, and having its extremities turned forward toward the iris. It consisted of two concentric strata, limited by a narrow, brownish band of pigmented epithelium. The retina extended in a straight line to the lens and was covered by small nodules. The subretinal space was filled with a turbid, reddish liquid. The ciliary processes were enlarged and pushed forward. The lens was small, oblique, and opaque in spots. The iris was atrophic. The anterior chamber was shallow and contained masses of a yellowish substance at its periphery, which proved to be gliomatous. The papilla was destroyed, the tumor being continuous with the optic nerve. The lens was the seat of a capsular cataract and its fibres were broken down, but it showed no neoplastic elements. Except at its posterior part, which was occupied completely by the growth, the retina was reduced to an atrophic membrane. The part of the retina which was still distinct from the growth showed an infiltration with the new cells and numerous pigmented cells and cysts near the ora serrata. The choroid also evidenced a propagation of the growth along the course of its vessels.

Diseases of the Optic Nerve.

An instance of deep cupping of both discs, in a man 37 years of age, is reported by Hotz, of Chicago. ⁶¹_{Dec. 1, '94} From early child-

hood the vision in the left eye had been reduced to light-perception as the result of an injury. In the right eye an excentric scotoma had made its appearance three years previously and the field had become much contracted for color, but had remained normal for white. The depth of the depression in the right eye equalled 8.5 dioptries and in the left eye 11 dioptries. Tension was normal in both eyes.

Coleman, of Chicago, ⁶¹_{Dec. 1, '94} also records a case of deep excavation of the disc in eyes with normal tension. The nerves were atrophic and the fields contracted. Fisher, of Chicago, ⁶¹_{Dec. 1, '94} has seen cupping to the depth of 6 dioptries in the right eye and to 5 dioptries in the left eye in the optic discs of a woman 55 years of age. Tension was normal.

Gifford, of Omaha, ²⁴⁹_{July, '95} cites an instance of extensive hyaline formation in the optic nerve of the right eye of a girl 8 years of age. The superior arteries were almost entirely occluded and changed into glistening white bands from their point of emergence to a considerable distance on to the retina. There were vitreous opacities and a few faint, recent hæmorrhages in the posterior part of the chamber. The points of interest were the extent of the affection, the condition of the vessels, and the age of the patient.

A case of relapsing and alternating acute optic neuritis has been observed by Hansell, of Philadelphia, ¹¹⁹_{Jan. 26, '95} in a syphilitic man 43 years of age. The right eye was primarily affected, the neuritis being of a moderate grade. There was a large central scotoma. Under administration of potassium iodide vision improved in three weeks' time, from counting of fingers eccentrically to full acuity. Less than one week later the left eye became similarly affected and there was, in addition, an inflammation of both ciliary bodies and irides. This likewise yielded to treatment, only to be followed by recurrences, first in the right and then in the left eye. A case of hereditary retrobulbar neuritis is reported by Dodd, of Chicago, ¹⁰¹⁸_{July, '95}. One sister had a similar affection beginning at 12 years of age. Despite treatment, vision gradually failed.

A tumor of the optic nerve has been observed by Ahlstrom, of Gottenburg, ²¹⁷_{V. 16, Nov., '94} in a girl 12 years old. The first indication of the appearance of the growth was a proptosis which had occurred three years previous to the author's observation of the patient. There was a history of gradual loss of sight and frontal headache, with pain over the affected eye. The bulb was dislocated anteriorly and its movements were but little affected. A non-pulsating, resistant mass could be felt surrounding the organ. After enucleation the growth was extirpated and found to be of a sarcomatous nature, which had undergone myxomatous degeneration. The

author is of the opinion that the tumor had sprung from the interior portion of the anterior half of the optic nerve.

In a woman about 50 years old, who died in ten hours from the effects of copious cerebral hæmorrhage, Bouveret,^{92 July, '95} found a bilateral hæmatoma of the optic nerve. The blood had entered from the subarachnoidian space, which it had entirely filled. The writer thinks that the choked disc, which arises after cerebral hæmorrhage, indicates an hæmatoma of the nerve and calls for a grave prognosis.

Finlay, of Havana,^{249 Apr., '95} made a careful histological study in a case of alveolar fibrosarcoma of the optic nerve occurring in the practice of Lopez, of Havana. The growth had extended into the interior of the eye, forming a mushroom-shaped projection from the head of the nerve. The retrobulbar portion was cylindrical, soft, granular, and surrounded by a thick, fibrous capsule. The great bulk of the neoplasm was evidently a fibrosarcoma of the small spindle-cell type, in which the structure was atypical. A portion, however, presented a curious alveolar structure, the cells within some of the alveoli having an endothelial appearance. The intra-ocular part of the growth, especially that bordering on the vitreous, was apparently undergoing myxomatous degeneration. The specimen was obtained from a woman 55 years of age. The patient died, one year after removal of the growth, with cerebral symptoms. The optic nerve in the fellow-eye had become atrophic.

Wounds, Injuries, and Foreign Bodies.

Hillemanns, of Bonn,^{254 Dec., '94} found that 30 per cent. of all his clinical patients and 40 per cent. of all the men visiting his clinic were treated for injuries of the eyeball. Prominent among the resulting affections was *ulcus serpens*, and he believes that this form of corneal ulcer is much more frequent in injuries from wood-splinters, straw, etc., on account of the wound being lacerated and more liable to contain infectious matter.

A case of luxatio bulbi is reported by Chalupecky, of Prague, in a 15-year-old boy,^{57 July 14, '95} due to an injury by a hay-fork. The patient was very apathetic; the pupil was somewhat dilated, reacting feebly to light. Vision was *nil*. After the eye had been replaced by pressure ocular movements were good, but the vision remained the same until the third day, when hand-movements could be seen. The eye-ground was normal. Vision gradually increased, returning to one-sixth of normal. The field was cut, especially on the temporal side. The patient was seen after two and one-fourth years, when the pupil was found to be slightly dilated. Vision equaled $\frac{1}{16}$. The eye-ground was normal and

the visual field was slightly contracted to the temporal side. The author states that optic atrophy, following severing of the nerve, does not show itself for a considerable lapse of time, and an immediate positive diagnosis is therefore impossible. The temporary blindness that is produced by luxatio bulbi is due either to a stretching of the optic nerve or to circulatory changes within its contained vessels. After luxation he replaces the eye by applying increasing pressure upon the globe, while he assists the return with an oiled spatula placed under the upper lid. While suturing the severed optic nerve will not restore the vision, it should be practiced in partially separated nerves; but if the avulsion be too great or if the globe cannot for some reason be replaced, enucleation should be performed.

Rosmini, of Milan, ³⁰_{Oct., Nov., '94} reviews the numerous dangers to which working-men are subject by the impact of foreign bodies upon their eyes, and advises the use of protecting glasses as recommended by Schweigger.

Page, of Amiens, ¹⁷³_{Nov., '94} has reported a case in which three distinct ruptures of the choroid followed an injury of the globe by a ball. The ruptures were concentric to the optic disc, and were situated in the macular region. A case of rupture of the choroid, followed by detachment of the retina and chronic glaucoma with total loss of vision, has been observed by Van Nieuwenhuyzen, ⁴⁵⁴_{July, '94} in a woman 24 years old, as the result of an apparently slight injury of the orbit. The glaucoma and the detachment appeared some months later, but the choroidal rupture was observed a few days after the accident.

For the localization of large iron and steel foreign bodies with the sideroscope, Asmus, of Breslau, ²⁵⁴_{June, '95} employs a second magnetic needle held with opposite poles toward that of the sideroscope, so that the magnetized foreign body in the eye can have no influence upon the needle of the instrument. The second magnet is gradually moved away when the point of maximum attraction of the foreign body shows its position in the eye. For the detection of minute particles of iron he employs a second magnetic needle beneath, with its poles similarly placed to the first one of the sideroscope.

An interesting case of an extra-ocular gunshot wound has been reported by Bourgeois, of Reims. ¹⁷³_{Jan., '95} A small shot entered the upper lid at the inner angle and passed backward, wounding the globe to such an extent that a band of choroidal atrophy ensued. There was immediate and permanent blindness and paresis of all the third-pair muscles except the superior rectus. Twenty-six days later there was marked atrophy of the optic nerve,

although the retinal vessels were normal. The shot had evidently severed the nerve behind the entrance of the retinal vessels into the nerve.

Three cases of shot wounds of the eyes following attempts at suicide are reported by Gottberg, ²⁵⁴_{Apr., '95} in which binocular blindness resulted. The lesions noted were hæmorrhages into the vitreous humor and retina and tearing of the tunics of the eye, with severing of the optic nerve. Ovio, of Padua, ⁷⁸_{July, '96} reports a case in which penetration of the eye by a leaden shot was followed by the formation of cataract. On removal of the lens all further symptoms disappeared. Later the shot was taken from the anterior chamber, into which it had fallen from the vitreous. A series of experiments were then instituted which showed that shot infected with a culture of staphylococcus aureus became sterile on being fired from a gun. In a second series of experiments shots of lead were introduced into the anterior chamber of eight rabbits and into the vitreous of seven others. In no case was there any severe inflammatory reactions, cataracts forming in two cases and opacities in the vitreous appearing in one. From these experiments the author would not interfere immediately in shot wounds of the eye, but would dress the wounds antiseptically and await developments.

Wagenmann, of Jena, ²⁰⁴_{B.40,H.5} observed a case in which a piece of glass penetrated the cornea and became imbedded in the floor of the anterior chamber, where it remained immovable. The eye was quiet. After five months a beginning corneal opacity became apparent, which constantly increased until the foreign body was removed, one year after the accident. The author believes that this opacity was caused by the irritant chemical action of the foreign material upon the endothelium and substantia propria of the cornea, as it proved to be perfectly sterile upon its removal from the eye. In operating in such cases he prevents prolapse of the iris by making the incision obliquely through the cornea, so that the outer will be higher than the inner. The corneal opacity in his case rapidly decreased after operation, vision increasing from the counting of fingers at four metres to $\frac{6}{15}$ with glasses.

Oliver, of Philadelphia, ²¹²⁹_{V.1,N.6.1} successfully removed a piece of steel from the iris of the left eye of a negro, 29 years of age, by an electro-magnet, with the result of restoring the vision to normal. In five days' time, after all irritative signs had disappeared and the pupil became fully dilated, a small localized area of capsular scar could be seen. Vision has remained good ever since the accident. The case is of interest as showing the quick subsidence of inflammation by immediate operative interference and careful after-treatment. Miquet, ⁹⁹⁶_{Dec.10,'94} recorded a case in which a foreign body, which

had entered the vitreous through the corneal limbus, was visible in the vitreous. Vision was normal. As the foreign body produced much pain, it was removed by the magnet through a scleral section twenty-five days after the accident. The metal weighed 0.0035 gramme ($\frac{1}{18}$ grain) and measured 0.0019 millimetre by 0.0009 millimetre. Notwithstanding the presence of vitreous opacities, the patient could read after removal of the body.

A case in which an iron fragment two millimetres by one millimetre remained quietly in the anterior chamber for two and one-half years has been reported by Wintersteiner.⁵⁷
Dec. 2, '94 From its appearance he believes that it penetrated the iris and lens, which, after swelling and breaking, carried the foreign body into the anterior chamber, where it could be moved with a magnet. Knapp, of New York,²⁵⁴
Nov., '94 points out that foreign bodies may remain quietly in the eye for a considerable time before causing inflammatory symptoms. In recent cases when the second eye is blind he considers it safer to treat the injured eye expectantly, facilitating encapsulation of the foreign body by absolute rest in bed with the head somewhat elevated.

Lagrange, of Bordeaux,⁷⁸⁰
Nov., '94 enucleated an eye in which he found a piece of bronze which had been *in situ* seven years. There were large exudates into the vitreous and total detachment of the retina, but no pronounced inflammatory reaction nor symptoms of irritation could be found.

Randolph, of Baltimore,¹
Feb. 23, '95 successfully treated two cases of wound of the ciliary body and lens with probability of the foreign body within the eye and a third case of penetrating wound of cornea and lens by extraction of the lenses. In the first two cases there was no light-perception, but after the operation perception of objects was possible. The conclusions drawn by the author are: 1. In penetrating wounds of the ciliary region and lens, even where light-perception is gone and where usually enucleation is performed, the removal of the lens will often be followed by the recovery of comparatively useful vision. 2. The time to perform the extraction is in the first week of the injury, when there is less reason for entertaining the fear of sympathetic ophthalmia, and when sympathetic disease is too remote a contingency in any event, and certainly at this stage, to outweigh every other consideration. 3. The effect of the operation is to remove what is really a foreign body, and at the same time it frees the ciliary region of its infectious contents,—very much the effect of opening an abscess. 4. Cleanliness is imperative in this operation. He usually sterilizes his instruments in a 2-per-cent. solution of bicarbonate of sodium, and keeps the field of operation constantly

irrigated with a 2-per-cent. solution of boric acid. Any solutions that irritate—such, for instance, as sublimate solutions—are to be avoided, as they weaken the resisting powers of the eye. The after-treatment consists in the instillation of atropine, 1 per cent., every four hours, and the wearing of a compress bandage. 5. Improvement in these cases, as would be expected, is rapid, and unless it is rapid one should not delay enucleation.

Before attempting the removal of a foreign body from the lens Gruenthal¹³_{May 15, '95} allows the cataract to ripen and inflammatory symptoms to subside, when he removes the lens with the body. He advises the use of a magnet in all cases of foreign body of the iris. In wounds of the cornea with a tendency to separation of the edges, de Wecker, of Paris,¹⁷¹_{Nov., '94} dissects up the conjunctiva from the edge of the cornea to the insertions of the recti muscle and unites the two portions in the median line. The entire cornea is thus covered and the wound heals quickly. The flap adheres only at the part of the cornea wounded, becoming detached elsewhere and leaving no trace of the disturbance.

Fage, of Amiens,¹⁷¹_{Oct., '94} has employed the scleral suture in a number of instances and finds that it possesses the following advantages: (1) when inserted immediately after the accident it prevents infection; (2) prolapse of the vitreous is rendered much more difficult; (3) the formation of fistulæ, cystoid cicatrices, and staphylomata are prevented; (4) by leaving a more regular and less retracted cicatrix, secondary detachment of the retina is avoided; (5) healing is hastened. It is contra-indicated when the eye contains a foreign body or where the conjunctiva is intact. The author uses catgut for suturing. From a study of a series of cases of injury to the eyeball, Curry, of Philadelphia,²¹²⁹_{v.1, No.1} concludes that eyes with perforating wounds should be given ample time for recovery under treatment, and that, as exemplified in a number of such cases, eyes with such wounds as formerly would have condemned them to immediate enucleation have been saved in a condition of greater or less efficiency and safety by subjecting them to such treatment as rest in bed, atropine, ice-compresses, and constant care.

Terson, of Paris,¹⁷¹_{May, '95} thinks that in corneal cicatrices with incarceration of the iris there exists a constant danger of infection and consequent panophthalmitis. When taken at the beginning it can be arrested by cauterizing the infected point. He advocates subconjunctival injections of corrosive sublimate. When the phlegmon is well established and if the eye is not perforated, enucleation is necessary. If it is perforated the anterior segment should be amputated.

Bach, of Würzburg, ²⁵⁴_{Apr., '90} has made some experimental examinations of the danger of infection in perforating wounds of the eye when there is disease of the conjunctival sac, and has further contributed to our knowledge of the bacteriology of the latter. The experiments were performed in the following manner: He made a penetrating wound six to eight millimetres long directly in the limbus in the eyes of fifty rabbits. Twenty-five of these animals had had the conjunctival tract infected with the staphylococcus pyogenes aureus previous to the operation and twenty-five afterward. The animals were then kept under observation for two or three days. At the end of this time the author found that the eye was affected in 20 per cent. of the cases when the germs had been carried into the sac previous to the operation, but in only 8 per cent. when the staphylococcus was introduced after the operation. Of ten instances when a corneal wound was made with an infected knife, nine were lost from panophthalmitis and the remaining one continued free from the disease by reason of an escape of the aqueous which was sufficiently forcible to cleanse the lips of the wound. He concludes from this that the most important step in operating is to have perfectly clean instruments; that the danger of an infected conjunctival sac in itself is not so great, but becomes serious when the germs are carried into the tissues by the knife. Mechanical cleansing of the conjunctival sac is sufficient, chemicals being irritating and injurious.

An exhaustive study of the subject of purulent metastatic ophthalmitis has been made by Axenfeld, of Marburg, ²⁰⁴_{B-40, H-4} who found that when the affection occurred in pyæmia it formed a complication of ulcerative endocarditis in about one-third of all cases. Endocarditis occurs in 50 per cent. of the bilateral cases of ophthalmitis and in 21.7 per cent. of the unilateral type. When the ocular inflammation is bilateral the prognosis is grave, especially if it be of puerperal origin, when it is almost always fatal. In puerperal and surgical cases there is nearly always extensive inflammation at the place of infection, this usually being a purulent thrombophlebitis. In reality, these cases are instances of secondary pyæmia, while the cryptogenetic cases are examples of primary pyæmia. Unilateral ophthalmitis may occur in mild attacks of pyæmia. Bilateral ophthalmitis is due to minutely divided septic material which, for the greater part, lodges in the retinal capillaries. Unilateral and exceptionally even bilateral ophthalmitis is the only metastasis that can be detected in mild cases of pyæmia; and, if it occur simultaneously with the general symptoms in a cryptogenetic case, it simulates the spontaneous form of ophthalmitis. In puerperal cases the streptococcus pyogenes is the

principal pathological microbe, while in the surgical cases the staphylococci are also found. The pneumococci of Fränkel and Weichselbaum are found in cases due to internal diseases, and usually produce phthisis bulbi without actual panophthalmitis, particularly in cases dependent upon epidemic cerebro-spinal meningitis. The term "metastatic choroiditis" should not be employed, as it is the retina which is usually primarily affected. Ophthalmitis occurring in cerebro-spinal meningitis is probably of metastatic origin.

Leber, of Heidelberg, ⁷⁸_{Oct. 94} states that particles of copper which have penetrated into the eye should be removed when the nature of the traumatism or the evident microbic infection does not indicate the necessity of enucleation. The presence of pus need not always indicate enucleation, for the author has shown that copper may produce a purulent inflammation by mere thermal action, which subsides rapidly after the removal of the foreign body and does not give rise to sympathetic ophthalmia. Of 46 cases seen by the author 38 came under treatment. Enucleation or evisceration was performed in 9 of these cases at once, while the foreign body was successfully removed in 77 per cent. of the remaining cases. Of this number the traumatism had involved the posterior segment of the globe in 18 cases and the anterior in 6. In the remaining cases the shape of the globe was preserved, although there was no light-perception in 15 instances. In 8 cases there was a visual acuity ranging from counting fingers at one metre to $\frac{1}{6}$ dioptr.

In experimentally infected diseases of the eye, Perles, of Munich, ²⁰_{May 3, 95} has found that the Fränkel pneumococcus and the Friedländer bacilli, when introduced into the interior of the rabbit's globe, are as virulently destructive as the streptococci. Unless greatly attenuated, the injection of Fränkel's pneumococcus results in general infection and death of the animal. This observation is of value in view of the great number of Friedländer bacilli that are frequently present in the healthy mouth and communicating cavities, especially in ozæna. In his experiments infection of the cornea without penetration resulted in an abscess which healed with a dense scar. The conjunctiva, when uninjured, was not affected. When yellow or orange sarcinæ, saprophytic bacilli of decaying fish, and cholera spirilla were introduced into the interior of the eye, they produced no apparent alteration. Typhus and diphtheria bacilli were not found three days after inoculation into the anterior chamber, but produced destruction of the eye when introduced into the vitreous. Pus containing streptococci, when introduced into the anterior chamber, proved more destructive than pure cultures, the latter allowing the eye to return to normal after

three weeks' time, while the former caused destruction of the eye. Abscesses followed the injection of both into the vitreous.

Hilgartner, of Austin, ¹⁰¹⁸_{July, '96} cites a case of sympathetic ophthalmitis as counter-evidence to the infectious theory of this disease. The sympathetic disturbance was excited by a sensitive, calcareous, shrunken globe resulting from a penetrating wound received twelve years previously. After enucleation three relapses occurred, the last being the most severe and appearing several weeks after enucleation.

Stephenson, of London, ⁶_{Sept. 22, '94} has seen cellulitis follow Mule's operation, necessitating enucleation of the remaining stump three months after evisceration. Microscopical examination showed extensive hyperplastic changes in the sclera. The cavity of the sclerotic contained fibro-cellular material or open mesh-work showing many large, vascular channels. In the optic nerve the axis-cylinder could not be distinguished, and the fibrous reticulum was denser and more cellular than normal.

Four cases of sympathetic uveitis, in two of which cure was effected, one continuing under observation for a period of five years and the other for seven years, are reported by Rogman, of Gand, ¹⁷¹_{Aug., '96} who quotes four other cases and says that these are the only cures that have been cited, in the last fifteen years, where the results have been under observation for a sufficient length of time to enable one to assert that the cure is permanent; recurrences and tardy complications have been observed as late as five years after the first attack. He concludes that sympathetic uveitis is an affection of extreme gravity, where the prognosis must be reserved for a long time. It is not just, however, to attribute to it the desperate fatality that some modern writers are prone to give. The only effective treatment is the preventive, though at the beginning the disease may give way to the means at present in use, provided that they are employed with necessary energy and perseverance.

Pfister, of Luzerne, ²¹⁴_{Sept. 1, '96} thinks that the name "ophthalmia migratoria" is better than "ophthalmia sympathetica," as it is an infectious process traveling along the central lymphatics and the sheath of the optic nerves from the injured eye. He advises the immediate removal of a primarily affected eye, and does not consider panophthalmitis as a contra-indication, because he has never seen bad results follow the removal of such eyes. He advises frequent dressing, washing of the socket with bichloride-of-mercury solutions, a side position of the head, and drainage. Exenteratio bulbi should never be performed, as it is but a temporary measure and sympathetic inflammation has followed its use.

A case of sympathetic inflammation has been reported by Nieden, of Bochum, ²⁵⁴_{Nov., '94} preceded by a sarcoma of the choroid of the exciting eye. The patient was a woman, 20 years old, who had a detached retina in the exciting eye, but no rise of tension. This eye became the seat of plastic iritis, which recovered under treatment. Several months after, both eyes were attacked with iritis, while the symptoms of intra-ocular growth became more marked in the exciting eye. A microscopical examination of the eye by Deutschmann showed an unpigmented sarcoma and a number of micrococci. As the eye had never been opened, the author thought that the cancer-cells had wandered there, having produced the first attack of iritis by their toxins, and, finally, the sympathetic ophthalmia.

Pincus, of Posen, ²⁰⁴_{B.40, II.4} made an anatomical study of two sympathizing eyes, one of which contained a cysticercus. This eye had been blind for fourteen years, and, notwithstanding that the entozoön had produced an intense inflammation of all the ocular tunics, more particularly of the uvea, there were no symptoms of sympathetic inflammation until the eye was opened for the removal of a cataract. Sympathetic inflammation at once supervened. The second case presented nothing unusual, but the discovery of a micro-organism in the sheath of the optic nerve in this case, as well as in the former, led the author to conclude that it must be always by this path that germs reached the sympathizing eye. Bourgeois, of Reims, ¹⁷³_{July, '95} has also made a careful bacteriological examination of twelve eyes, which were removed either upon account of symptoms of sympathetic irritation in the sound eye or in order to prevent the appearance of such symptoms. All cases of panophthalmia were excluded. In only one instance was an organism (*staphylococcus aureus*) found, the results apparently disproving the microbic origin of sympathetic ophthalmia.

Mulder, of Gröningen, ¹⁷¹_{Mar., '95} prefers the operation of evisceration to enucleation, as being easier and less apt to be followed by panophthalmitis. He has not found sympathetic ophthalmia to be influenced by the introduction of a ball into the stump. Evisceration is especially indicated in cases of arterio-sclerosis, where hæmorrhage is to be feared, in panophthalmitis, in traumatic cases, in shrunken globe, and in all cases where a cosmetic effect is of prime importance. Venneman, of Louvain, ¹⁷¹_{Feb., '95} claims to obtain a larger and a firmer stump after enucleation by producing an organization of a blood-clot under the conjunctiva.

A series of experimental and anatomical studies regarding the mode of healing after optic neurectomy in the rabbit have been made by Velhagen, of Göttingen. ²⁵⁴_{Nov., '94} He found that by this

operation there was a complete interruption between the lymphatics of the eye and the brain in all the animals that he operated upon. He concludes therefrom that, if the cicatrization after optic neurectomy occur the same in men as in the rabbit, the microbes contained in the globe are unable to travel as far as the chiasm after a period ranging from thirteen weeks to eighteen months.

In reporting three cases of modified evisceration (*evidement*) for panophthalmitis, Truc, of Montpellier, ³_{Oct. 24, '94} highly advocates this procedure. The operation can be done under cocaine, and is followed by but slight reaction; recovery is prompt.

Fromaget, of Bordeaux, ²⁷⁴_{Nov., '94} has collected twenty cases of tetanus following traumatism of the eye and orbital tissues, and reports an additional case observed by him. This was an instance of a penetrating wound of the globe, produced by a piece of hot metal. Three or four days after the injury panophthalmitis supervened and symptoms of tetanus appeared. The injured eye was eviscerated. In a few days the muscle of the face, as well as the extrinsic muscles of the uninjured eye, passed into a state of tetanic spasm. The action of the lids was conserved. When first seen the iris reacted well to light and accommodation, but after a time it lost the reflex for light. Still later, myosis appeared. The patient died of tetanic convulsions shortly after the operation. The author has found that most of the cases reported followed wounds of the orbit, and that they were complicated by facial paralysis, which could not be explained by the lesion.

Glaucoma.

It is believed by Adamük, of Kasan, ²⁵⁴_{Apr., '95} that glaucoma is caused solely by mechanical pressure upon the vena vorticosa in cases in which the sclera is thin. Mydriatics decrease the intra-ocular pressure in normal eyes, while myotics increase it. The increased glaucomatous symptoms produced by atropine are due to the rapid mydriasis causing a contraction of the blood-vessels of the iris and an overfilling of the vessels of the ciliary body, which lead to increased lymphatic filtration when the vena vorticosa are somewhat obstructed. He reports two cases of malignant glaucoma in which intra-ocular hæmorrhages with resulting blindness occurred after the performing of an iridectomy upon the better eye. The corneal wound failed to heal permanently, owing to the lowered vitality of the tunics of the organ. In view of such results, he suggests that in all slowly and unfavorably progressing cases sclerotomy or only a paracentesis should be made upon the cornea of the better eye.

Richey, of Washington, ¹⁰¹⁸_{July, '95} considers the evidence concerning

the notion of chronic interstitial ophthalmitis sufficient to establish the claim that in primary simple glaucoma the local affection is a fibrosis or connective-tissue hyperplasia which, by the growth of the degraded tissue, chokes the special functional tissues to death. Gould, of Philadelphia, ¹⁰¹⁸_{July, '95} suggests, as one of the causes of glaucoma, "the choking or clogging of the sieve of the membranous septum of the lens-ligament by the *débris* sediment or solution of the aqueo-vitreous chamber." Massage, properly and intelligently applied, meets the therapeutic indications. From a consideration of the halo in glaucoma, Willits, of Pittsburgh, ¹⁰¹⁸_{Jan., '95} is of the opinion that it is dependent upon stasis and œdema of the cornea, the varying distinctness of the symptom being due to the stage of the œdema.

Snellen, Sr., of Utrecht, ¹⁷¹_{Mar., '95} has treated three cases of buphthalmia by making punctures of the anterior chamber every third day. He succeeded in arresting the disease for long periods of time, during which the cases were under observation.

Puech, of Bordeaux, ¹⁷¹_{May, '95} reports a case of acute glaucoma in a man of 20. The attack was renewed several times with decreasing intensity. After each exacerbation the eye became elongated and a ciliary staphyloma developed. The myopia produced was at first 3 dioptries, and finally reached 10 dioptries, the patient having been emmetropic at the time of the first attack.

Satterlee, of Buffalo, ¹⁷⁰_{Sept., '94} has seen complete glaucoma supervene upon the use of atropine in the eyes of a man in whom vision had been failing for six months. Operation failed to restore sight. An interesting case of acute glaucoma induced by atropine has been seen by Fisher, of Philadelphia. ²¹²⁹_{V.1, No.1} The glaucomatous symptoms supervened upon the use of the mydriatic, before and after a needling operation, in a 12-year-old girl. The symptoms subsided under the instillation of eserine and the performance of paracentesis. The inadvertent use of atropine some days later was again followed by a rise in tension accompanied by fever.

Puech, of Bordeaux, ¹⁷³_{Aug., '95} reports a case of glaucoma and myopia occurring in an engraver, 33 years of age, who had had excellent sight until he was 20 years old. At that time he was suddenly seized with sharp pains in both eyes, radiating through the head, with loss of vision. The eyes were red and the pupils were dilated. The intense pain persisted for three weeks, the vision being reduced to faint light-perception. Three months afterward vision was sufficiently restored to permit of his return to work. It remained good for two years; then it gradually weakened for distance, compelling him to stoop over his work. A bluish circle appeared on "the white of the eye" and gradually

broadened. He had frequent visions of rainbow circles. At the end of seven years myopia began and gradually increased in degree up to 10 dioptries. When first seen by the author there was slight protrusion of the eyeballs, with an ectasia, globular in form, commencing three and one-half millimetres outside the cornea, which was composed of three zones,—a middle, slightly darker zone separating two of much lighter color. The irides did not react to light, but responded to eserine. The tension was equal to + 2 in each eye. There was no ciliary tenderness. The ophthalmoscope showed an atrophy of the optic nerves with glaucomatous excavations. Vision in the right eye equaled $\frac{1}{6}$ with — 9 D. The left eye was blind. The right visual field was markedly reduced to the nasal side. A diagnosis of glaucoma, which had developed in a young subject, as the result of a yielding of the sclerotic under the influence of at first severe, then intermittent, increases of the intra-ocular tension, was made.

Puech, of Bordeaux, ⁷⁰_{Oct. 14, '94} has seen an instance of central scotoma of ten degrees in extent twelve hours after a prodromal attack of glaucoma.

Zentmayer and Posey, of Philadelphia, ²⁴⁹_{July, '95} from a study of one hundred and sixty-seven cases of glaucoma simplex occurring in the practices of Norris and Oliver, of the same city, draw the following conclusions: Simple glaucoma occurs in either sex with about the same degree of frequency, but manifests a preference for males. The majority of cases occur in the beginning of the fifth decade. It is quite uncommon, occurring in about 0.736 per cent. of the cases which seek treatment at ophthalmic hospitals. All forms of ametropia are equally liable to this affection. With the exception of articular rheumatism and influenza, which appear to induce changes that favor its development, there are no other particular systemic diseases which predispose to it. It is a binocular affection, although a period of twenty months usually intervenes between the manifestation of the symptoms in the two eyes. The two most prominent subjective symptoms are failing sight and headache, but neither of these possess characteristics which would serve to differentiate them from those occurring in other forms of ocular disease. This form of glaucoma is slowly progressive, two and one-half years being the average length of time required to induce blindness after the appearance of the initial symptoms. Signs of irritation in the anterior segment of the eye are usually absent, but 4.52 per cent. of the cases exhibit such changes. An inflammation of the optic nerve is a constant attendant upon glaucoma, being noted in every eye containing a pathological excavation. It manifests itself as a low-grade neuritis affecting the entire structure of

the nerve, and seems to render the nervous tissue more liable to the peculiar kind of excavation which is the most constant characteristic of glaucoma. No one of the four findings most commonly observed in glaucoma is essential to the disease, for the disease may occur without an excavation, without the field being contracted, without the diminution of central visual acuity, or without rise of tension. The excavation, however, is the most constant symptom, occurring in 81.43 per cent. of all the eyes which were examined.

Although the excavation shows a marked predilection to occupy the temporal half of the disc, no part of the nerve escapes. In incipient cases it appears at the temporal edge of the disc as a continuation of the physiological excavation. From here it gradually spreads over the head of the nerve, encroaching upon its structure until only a narrow rim of nerve-fibres remains at the nasal edge. Central visual acuity may remain normal, although the field for form and color be encroached upon (in 10.77 per cent. of the cases). The tendency of the scleral ring to become visible all around the disc and its disposition to broaden especially to the temporal side are significant of the degree of intra-ocular tension to which the globe has been subjected, and go hand in hand with the extent and depth of the excavation. As the broadening of the ring, however, usually appears before the excavation, its presence in eyes possessing other symptoms of glaucoma should always excite suspicion of this disease.

Opacities in the refracting media are found in an unusually large percentage (86.52 per cent.). These, however, are to be regarded as being more the result of senility than an expression of the glaucomatous state. Arcus senilis (35.92 per cent.) and lenticular opacities (28.44 per cent.) are the most common, while corneal opacities, directly traceable to the increased intra-ocular tension, occur in 20.38 per cent. of the eyes. Vitreous opacities occur in but few instances, and, originating in a choroiditis which complicates the disease, are not an essential feature of it. The cornea is the most liable of the refracting media to be affected by the glaucomatous process. The increase in intra-ocular tension, as determined by palpation, is not necessarily a constant factor, being detected in 109 eyes (32.63 per cent.). Where the tension is increased the field will be distinctly cut or the nerve excavated. Rigidity of the sclera is often the first indication of increased ocular tension. This rigidity may be accounted for either by a connective-tissue thickening in that tunic or by an actual increase in the intra-ocular tension, rendering the sclera more resistant to the examining finger. The shallowing of the anterior chamber exists in eyes where there is no excavation, but the converse is

not true, for in every eye where there is an excavation the chamber will be shallow, seeming to show that the condition occurred before the increased tension had excavated the nerve. As the chamber grows shallower and the tension higher the pupils will become larger, and the larger the pupil the less will there be reaction to light. This is not always true, however, for in twelve instances where the tension was distinctly elevated and there were well-marked excavations the pupils were but two and one-half millimetres in size and they responded perfectly to light and convergence stimuli. Other signs of increased intra-ocular tension, such as the choroidal halo and the venous and arterial pulses occurring in such a small proportion of cases, show that they are not constant factors of the disease and that their absence cannot be regarded as negative evidence for the existence of a glaucomatous state. Increased tension limits the action of accommodation in only 34.88 per cent. of the cases. In the great majority the limitation of the field consists in a concentric contraction for color and form to an equal extent.

The consideration of the relative amount of contraction in the form- and color- field often adopted in the distinction between an atrophic and a glaucomatous excavation is valueless, as the findings show that in quite a large proportion (13.06 per cent.) of the cases the color-field was relatively more affected than the form. Indeed, in 16 of these 32 cases (50 per cent.) the form-field was normal, while that for red was contracted to 20 degrees or less. Contrary to the findings of other observers, the most frequent type of restriction of the visual field consists in concentric limitation of the entire field, and not in the contraction to the nasal side. The limitations of the field in this latter position in 7.92 per cent. of the cases evidenced that this portion of it was peculiarly liable to be altered by the glaucomatous process, for the other portions were not equally affected by the disease. Full fields are not inconsistent with glaucoma, for in 129 eyes where the state of the tension, the degree of the visual acuity, the character of the excavation, and the extent of the field were noted, 30 eyes did not exhibit any lessening in the extent of their fields for form or for color.

Nettleship, of London, ⁶_{Aug. 10, '95} considers it undesirable to maintain the distinction between typical chronic glaucoma and atrophy with cupping of the optic disc. The risk of deterioration of vision following iridectomy is less than has been supposed; the operation, when performed early, often retards the progress of the disease and not rarely causes permanent arrest of the affection. It is nearly always to be preferred to sclerotomy in chronic cases.

Cohn, of Breslau, ⁴_{May 27, '95} has recourse to the use of eserine in every stage of glaucoma, and, when this fails to contract the pupil and thus afford relief, he performs an iridectomy. The appearance of rainbow colors about the lights are characteristic of prodromal glaucoma. Rochon-Duvigneaud, of Paris, ³⁵_{Sept. 28, '95} has emphasized the value of the instillation of eserine and pilocarpine in glaucoma. He reports a case, in a man 46 years of age, which was controlled for four years in the prodromal period, and two cases of acute glaucoma which were relieved and visual acuity maintained for eighteen months and two years, respectively. In one of the latter cases iridectomy was necessitated in one eye. The drugs must be regularly used and in solutions of ascending strength. They do not definitely cure the condition,—merely delay operative measures. As a means of lowering the tension, sclerotomy may very often be advantageously combined with them. From a study of one hundred and sixty-seven cases seen in the same clinics as their previous studies were made in, Zentmayer and Posey, of Philadelphia, conclude ²¹²⁹_{V.1, No.1} that the effect of the administration of eserine and of the performance of iridectomy in checking the course of the disease is proportionally the same in the treatment of simple glaucoma. As operative procedures are always to be deprecated when other measures are equally valuable, eserine should be employed in all cases of the disease. If at the end of a month the extent of the field has diminished, iridectomy should be resorted to, as there will be nothing further to expect from the action of the drug. If at the end of that time, however, an improvement is noted, as evidenced by a study of the field, the drug should be continued, as there is reason to expect that a beneficial action will be exerted for ten months upon the extent of the field and fifteen months upon the visual acuity. After iridectomy is performed there is ground to believe that the course of the disease will be checked for a period of eighteen months in 50 per cent. of the cases. Eserine is powerless in 20 per cent. and iridectomy in 10 per cent. of the cases; so that 10 per cent. of all cases of simple glaucoma will not be benefited despite all therapeutic measures that may be employed. Both iridectomy and eserine exert a greater influence over central vision than they do upon the extent of the visual field. This is seen in the greater percentage of cases in which vision was improved, as well as in the length of time in which it remained conserved. The intra-ocular tension was more benefited by both methods of treatment than any of the other symptoms, for eserine lessened its degree in all but 20 per cent. and iridectomy in all but 10 per cent. of the cases.

Powers, of London, ⁶_{Aug. 10, '95} is of the opinion that many cases of

chronic glaucoma are dependent upon mental worry or grief, and are purely temporary. In such cases change of occupation, lapse of time, and general and local remedies generally bring relief. He has found scleral puncture very effectual in the acute, but practically useless in the chronic variety. Critchett, of London, considers it essential in the treatment of this disease to act quickly. Priestley Smith, of Birmingham, advises operation wherever there is vision, even though it be only light-perception, if the health of the patient permit. He considers the danger in operation to be injury or displacement of the lens and deep-seated hæmorrhage, the risk of both being diminished by preliminary scleral puncture. Swanzy, of Dublin, fears to operate when sight is reduced to the fixing-point, lest this amount of vision be abolished. Little, of Manchester, believes the cause of operative failure to be frequently due to placing the incision too near the cornea. Frost, of London, avoids operating as much as possible, depending upon the nightly use of cocaine and eserine, and performing iridectomy only when these means fail. MacKinlay, of London, advises early operation, making the incision with a Graefe knife as far back as possible. Williams has had excellent results from sclerotomy. McHardy, of London, approves of making a sclerotomy in the coloboma of the iridectomy when further interference is required. The incision should begin in the usual position and be carried far back to the apex, so as to pass rather behind the sclero-corneal junction. Fuchs, of Vienna, performs sclerotomy only in cases presenting increase of tension after iridectomy. He has given up operating in chronic glaucoma when there is no increase of tension. These cases may be looked upon as instances of optic atrophy with cupping.

In an article on the mechanism of iridectomy in glaucoma, de Vincentiis, of Naples, ⁷⁸_{Nov. 30, '94} combats the theory of a "filtration cicatrix" advanced by de Wecker, and attributes the benefit which follows it to the traction and displacement of the tissues at the angle of the iris. This theory is strengthened by the failure to relieve those cases in which this action of the operation is prevented, as where there is marked degeneration of the iris or complete peripheral or marginal synechiæ, and where the section is so made that the traction and displacement effects are lost. Decreased tension followed simple incision in four cases in which the iris was pressed away from the angle with a specially constructed blunt instrument.

De Wecker, of Paris, ¹⁷¹_{Oct., '94} says that the ideal operation in glaucoma consists in a large scleral incision, combined with an iridodialysis, extending the entire length of the cicatrix, which is

established in the pericorneal trabecular tissue. This is best obtained by what he calls a combined sclerotomy, which is performed as follows: After the instillation of a few drops of eserine and cocaine, a stop-knife is introduced into the cornea at the prolongation of its vertical diameter. The knife is slowly withdrawn, enabling the aqueous humor to escape slowly. The base of the iris is then torn from its insertion by making traction upon it by a fine pair of forceps, which are introduced through the puncture. By permitting the forceps to remain open a few moments in the wound, the disappearance of any blood from the iris is facilitated and re-attachment of the iris is prevented.

Parinaud, of Paris, ¹⁷¹_{May, '96} describes his manner of performing sclerotomy and sclerectomy and their indications in glaucoma. For his posterior sclerotomy he prefers a Graefe knife about two millimetres wide. The puncture is made between the external and inferior recti, at about eight to ten millimetres from the cornea, the point of the knife being directed toward the centre of the globe to a depth of four to six millimetres. The knife is given a quarter turn and then withdrawn. The most important point for the success of this operation is an avoidance of any inflammatory reaction in the wound which would cause the closure of the sclera by cicatrization. If this is attended to, the wound is closed only superficially by the conjunctival and episcleral tissue, through which the scleral wound may be seen, remaining open for an indefinite period. The surest way of accomplishing this is to displace the conjunctiva before the incision is made, so that the conjunctival and scleral wounds do not correspond after the conjunctiva is released. The more posteriorly the puncture is made, the more likely it is that it will result in a subconjunctival blind fistula. This result is to be desired only in absolute glaucoma, where preservation of sight is no longer an object. The fistula can be destroyed by galvano-cautery. He admits that the relief of pain by a posterior sclerotomy is temporary in the majority of cases, and that it is not intended to replace iridectomy. It is indicated in a non-irritative, slowly-progressing glaucoma, where the utility of an iridectomy is doubtful. It is the best treatment for certain chronic glaucomas, when it can be frequently repeated and supplemented by myotics. It can also be used where iridectomy has failed.

The operation of sclerectomy consists in cutting out a small portion of the sclera in such a manner as to produce a shelving depression reaching to the choroid or very near it. This is done by sticking a needle into the sclera at eight to ten millimetres from the cornea, raising the part and excising a piece about three or

four millimetres square with a knife held parallel to the needle. The operation is completed at the same sitting, or later, by introducing the point of the knife in the bottom of the wound, so as to allow the intra-ocular fluid to escape. The object of the operation is to diminish the resistance of the sclera, in order to obtain, by puncture, a more effective filtration, and in some cases the formation of a staphyloma which will act as a safety-valve. The precautions to be taken are those that are necessary for the avoidance of inflammatory reaction. To accomplish this, besides ordinary measures, the choroid should not be wounded and the vitreous should not be allowed to escape. The most successful cases are those where the sclera has not been entirely cut through, but where there remains a thin layer of that tunic covering the choroid. The principal indication for this operation is in malignant glaucoma, where it is desired to avoid enucleation.

Medical Ophthalmology.

Square ⁶_{Dec 22, '94} has seen exophthalmos develop immediately after the receipt of a blow upon the right side of the head. The eye on the corresponding side was the more proptosed, and started from the head under chloroform narcosis. The retinal veins were engorged and there was diplopia in the morning. Vision was the same in both eyes. Stuelp, of Strassburg, ²⁵⁴_{June, '95} has had an opportunity of making a post-mortem examination in a case of traumatic pulsating exophthalmos. Clinically the case had presented the following symptoms: After a severe fall, left exophthalmos with marked œdema of the lids and orbital tissues, a fixed eye, and a marked choked disc appeared. In addition there was a visible and palpable pulsation in a three- to four- millimetre area between the eye and the upper and inner margin of the orbit. The pulsation could be stopped by compression of the left carotid. This artery was accordingly ligated, but in a few days there was right facial paralysis with diminished sensation in the left temporal region. The patient complained of a noise in the orbital region similar to that made by a locomotive, and accompanied by a loud bruit, which was audible by means of the stethoscope. There was a tremor and jerking in the right arm and the reflexes on the right side were weakened. Autopsy revealed an extensive fracture of the base of the brain, with a large area of traumatic softening of the left hemisphere of the brain, so that only a small portion of normal brain-tissue remained. There were hæmorrhages in the pons and fourth ventricle, probably the cause of the right-sided facial paralysis. There was a large thrombus in the posterior portion of the left cavernous sinus, with a large hole in the carotid bordering a portion of the sinus and extending to

the thrombus. From this autopsy the author concludes that after ligation of the carotid account must always be taken of possible existing lesions. A case of bilateral exophthalmos is reported by de Schweinitz, of Philadelphia.⁴⁵¹ The patient, a healthy man aged 41 years, had received an injury three weeks previously, the force of the blow having been most marked on the right side. Unconsciousness had supervened. There was exophthalmos, hyperæmia of the veins of the eyeball, paralysis of the right external rectus muscle, and slight passive congestion of the retinal circulation. Seven months later a roaring in the head, which increased in intensity and two months later was likened to the puffing of an engine, was noticed by the patient. Optic neuritis and retinal hæmorrhages now appeared. There was a well-marked systolic murmur which was particularly noticeable on the right side, and worse during recumbency and upon exertion. Pressure upon the right carotid stopped the bruit and compression of the left carotid diminished it. The author believes the lesion to have been an intra-cranial arterio-venous aneurism.

Bronner, of Bradford,⁶^{May 4, '95} reports a case of pulsating exophthalmos of the right side occurring in a married woman 36 years of age. Ligation of the internal carotid was followed by subsidence of all the symptoms except a slight swelling of the lid, slight difficulty in turning the eyes outward, and marked swelling of the retinal veins, which were very dark. There was no history of a blow or fall, no confinement or serious illness, and no arterio-sclerosis or heart disease. There was intense pain for seven days before the noise was heard or the eye began to protrude. The pain was evidently caused by an aneurism of the internal carotid, which increased in size for seven days and then broke into the cavernous sinus. The communication must have been at first small and gradually become larger, as the protrusion of the eyeball increased for three weeks and as there was no history of a sudden violent pain or intense noise. The vision was fairly good and there was no marked papillitis, proving that there must have been a free anastomosis between the central retinal vein and the inferior ophthalmic veins. There was no pulsation except when the patient bent the head. A case of exophthalmos in a male infant of 3 months was seen by Garrison, of Dixon.⁶¹^{Nov. 24, '94} The child was one of twins and had gastro-intestinal symptoms almost from the time of birth. There was tachycardia, the pulse ranging as high as 240 and the action of the heart being tumultuous. Under the application of heat and arseniate of copper, with the exception of an attack of grip with cerebral symptoms, the child steadily improved, so that eleven months later there was no evidence

of exophthalmos and the pulse-beat was lowered to 100 to the minute.

Panas, of Paris, ⁶_{Aug. 10, '95} asserts that many neoplasms of the orbit supposed to be lymphoma, sarcoma, or syphiloma should be considered the result of dyscrasia due to toxins. In support of this view he cites several instances where supposed malignant tumors subsided under medical treatment or an intercurrent erysipelas and were put down as syphilitic. In a case under his own observation, a man 35 years of age, free from syphilis, presented double exophthalmos, simulating in all respects sarcoma, which was aggravated by the administration of potassium iodide, but completely cured by arseniate of soda. The author thinks that the condition was due to microbic infection of the cellular tissue extending from an ozæna which affected the nasal fossa, the swelling being most marked on the inner side of each orbit. In a second case, in which exophthalmos of the left eye was associated with polypi of the left nostril, the condition had been assumed to be sarcomatous. He recommends that, in all such cases, search be made for the source of infection, and treatment by drugs resorted to before surgical interference is attempted. Hillemans, of Bonn, ³⁵³_{Dec., '94} observed peculiar associated movements of the jaw and the upper lid in a case of coloboma of the optic nerve. There was a slight degree of ptosis upon the side in which these movements occurred. The excavation in the nerve-head was deepest above.

An instance of tonic blepharospasm simulating ptosis, in a man 54 years of age, subsequent to excitement and anxiety in conjunction with excessive smoking and great physical exercise, has been cited by Pershing, of Denver. ⁸¹⁴_{June 1, '95} Katz ⁶⁵⁰_{Aug. 1, '95} believes that the act of winking is more frequent in tired eyes and has attempted to form an estimate of the degree of fatigue by means of the myograph of Marcy.

Oliver, of Philadelphia, ¹²⁰⁶_{Oct., '94} has given a brief clinical history of a case of indurated (Hunterian) chancre of the eyelid, with lymphatic engorgement. The initial lesion was quickly followed by secondary lesions of the skin and mucous membranes. During the course of the disease a marked diffuse retinitis appeared and subsided. Fournier, of Paris, ⁹⁹⁶_{Feb. 10, '95} has estimated that chancre occurs on the lid or the conjunctiva once in five hundred cases.

Moore, of New York, ⁴⁶²_{Sept., '94} considers mild acute conjunctivitis from irregular bowel action to be of quite frequent occurrence. Two cases of ophthalmia hepatica, in one of which a post-mortem examination was held, have been observed by Baas, of Freiburg. ²⁰⁴_{B. 40, H. 5} The first case was in a boy, 19 years old, suffering from cirrhosis of the liver. The disease in the second case continued from the

seventh to the fourteenth year, when death occurred. Icterus was present in both instances. Hemeralopia appeared in the first case a few months after the appearance of the first signs of the disease; in the second case it occurred only after a lapse of one and one-half years. The night-blindness varied in degree and was intermittent. The fields of vision and of color-perception remained normal and the distant vision was but slightly reduced. Xerosis conjunctivæ and a fine haziness of the lens and of the retina were present, but disappeared, as well as the hemeralopia, in the first case, after improvement of the general condition of the patient and the disappearance of the icterus. In the second case these symptoms persisted until death. The arterial walls were thickened and in the macular region there were numerous fine, sharply-defined, white spots. The pigment was greatly disturbed and absorbed. A few pigment-heaps were seen in the equator bulbi. Post-mortem examination showed that the ciliary processes were degenerate and sclerosed. A round-cell infiltration in flat heaps involved the pars planus corpus ciliarus directly under the hyaline membrane. The greatest changes were found in the choroid, the capillaries varying in width (between less than one-half to two and one-half times the normal size), and in places had bead-like enlargements. The larger vessels showed hypertrophy of the intima and partial obliteration of their lumen. The pigment-cells were atrophic, the retina and papilla were œdematous, and the arterial walls were thickened. These changes, the author believes, were due to the action of the icterus producing a sclerosis in the choroidal and other circulations. For this condition he suggests the name of "cirrhosis choroidea," and for the affection the name of "choroiditis hepatica or icterica."

A case of primary tuberculosis of the conjunctiva, in a boy aged 7 years, has been reported by Franke, of Hamburg.³⁴ June 29, '06 Microscopical examination showed a tubercular formation, but no bacilli. Inoculation into a rabbit's cornea established the diagnosis. The tubercles were quickly removed by excision and the application of the galvano-cautery. Baas, of Freiburg,²⁰⁴ B. 40, H. 5 believes that xerosis conjunctivæ is caused by degeneration of the epithelial cells, due to the circulatory changes produced by endarteritis obliterans of the subconjunctival vessels. The process extends from within out, the fatty-degenerated cells being thrown off. An epidemic of hemeralopia associated with conjunctival xerosis in an orphan asylum, where thirty out of three hundred boys were affected, has been observed by Dujardin, of Lille.²⁴³ July, '06 The hygienic condition of the patients was excellent. There was a history of a similar epidemic the preceding year. Wright, of

Columbus, ²³³_{Aug. 6, '95} has seen blepharospasm and photophobia lasting two years, where the only discoverable lesion was a few granulations on the upper lid of both eyes with haziness of one of the corneæ. Rapid recovery followed free canthotomy and local treatment.

Sous, of Bordeaux, ¹⁷¹_{Feb., '95} has observed diffuse keratitis in a child heal very rapidly after extraction of a first upper molar tooth upon the same side. Hutchinson, of London, ¹⁰⁷⁷_{Dec. 12, '94} gives the notes of a case of extensive, permanent, and dense opacities of the cornea with sequelæ of interstitial keratitis in a woman 46 years of age. The inflammation of the cornea had occurred when the patient was 38 years old. With the exception of notched upper incisors and the ocular condition, nothing in the appearance of the patient suggested a diagnosis of inherited syphilis. As instances of late specific keratitis, Chevallereau, of Paris, ¹⁵²_{May 3, '95} reports three cases of the typical interstitial form of the disease in subjects aged 20, 29, and 34 years, respectively. All had hereditary syphilis. Thomson, of London, ⁶_{Apr. 13, '95} concludes that the so-called interstitial keratitis is not a primary inflammation of the cornea, but one that probably originates in the anterior part of the uvea, which provides the nutritive supply for the cornea. It is not a characteristic symptom of hereditary syphilis, but is due to an insufficient supply of nutritive matter to the cornea, whether this is produced by cutting off the blood-supply experimentally or the result of a diminution of the lumen of the blood-vessels through a thickening of their walls. This latter condition (Heubner's endarteritis) is to be found in syphilitic disease of the retina and choroid, as well as in brain-syphilis. Bach, of Würzburg, ³⁴_{Apr. 30, '95} reports two cases in which he found primary tuberculosis of the cornea in patients who had a tuberculous family history and who showed some physical signs of tubercular disease. In one case three gray-white, circumscribed opacities were visible on the upper corneal edge, extending into the corneal tissue. There were also two smaller, light slate-colored swellings of the sclera below the cornea. In the other case the author believes that the tubercle was primarily situated in the pectinate ligament or in the corneal tissue at its limbus, and that it was associated with disseminated chorioretinitis.

Panas, of Paris, ³⁵_{Apr. 20, '95} has seen two patients suffering with influenza,—one with infected ulcer of the cornea and the other with panophthalmitis. He states that the ocular lesions which are seen in influenza are manifold, but if any predilection is shown it is for the optic nerve and retina, and for the various periorbital sinuses. In panophthalmitis enucleation should be deferred when the infection is from a general cause and the patient is in bad con-

dition, but when the origin is local and the general condition is good it should be performed at once. Berger, of Paris, ¹⁷¹_{May, '95} has observed iritis and otitis media, due to purulent rhinitis on the left side, caused by a retention of the nasal secretions from a tumor of the naso-pharynx. The conditions were improved by a partial removal of the tumor, but became worse as the growth increased in size and were not cured until after a total extirpation of the mass. An instance of herpes zoster of the iris occurring during the course of frontal herpes zoster has been reported by Machek, of Lemberg, ²⁵⁴_{June, '95} in a man, 50 years old, who suffered from a severe attack of the hæmorrhagic type of the disease. The vesicles in the iris resembled those on the skin. The eye was painful, the aqueous humor cloudy, and the pupil small. The iris was bound down to the lens by dense synechiæ, the anterior chamber was deep, and there were small, bleeding prominences in the iris. Several days were required to complete this clinical picture. The blood slowly absorbed, but after several months there were fresh hæmorrhages. The iris finally atrophied. The tension was quite markedly minus during the entire attack.

In a case of herpes frontalis complicated by iritis seen by Howard, of London, ⁶_{Oct. 15, '94} ptosis occurred on the tenth day and persisted for two weeks. Eales, of Torquay, ⁶_{Jan. 12, '95} has seen partial dilatation of a pupil follow thirty-two hours after a fall upon the side of the face. The iris did not react to light, but responded slightly to accommodation. Recovery of accommodation was complete in four days and in five days the iris again reacted to light-stimulus. Malgat, of Paris, ¹⁷³_{Dec., '94} has cured a case of spontaneous mydriasis of probable hysterical origin, occurring in a woman aged 50 years, by repeated injections of strychnia.

In discussing the variations of the pupils in pulmonary disease, Rampoldi, of Pavia, ³⁰_{Jan., '95} reports a case where a well-marked tuberculosis of the right apex was accompanied by a partial ptosis of the right eyelid and a myotic and sluggish pupil. He agrees with Destrée that this may be due to pressure upon the sympathetic by enlarged bronchial lymphatic ganglia. A case in which there was a unilateral Argyll-Robertson pupil is reported by Segel, of Munich, ²⁵⁴_{June, '95}. The affected pupil was myopic and responded very freely to accommodation and convergence. The lesion was probably pathological, originating in the centripetal pupillary fibres of the third nerve near its nucleus. The patient also had anisocoria and somewhat defective cerebration.

Terson, of Paris, ³⁶⁰_{Oct., '94} records a case of gumma of the ciliary body early in syphilis, and regarded by him as a precocious tertiary symptom. The diagnosis of this affection rests upon the presence

of syphilis as well as upon the symptoms of iridocyclitis, combined with the possible presence of gummatous masses upon the iris. There is also often extraordinarily rapid decrease of vision, minus tension, and the appearance, behind the limbus, of a small elevation simulating episcleritis. This prominence soon becomes yellow and soft and breaks down. These cases, though rare, should always be borne in mind in cyclitic conditions and in syphilitics. They may occur, as in his case, as early as two months after infection. Coppez, Jr.,⁷⁸_{Sept. 30, '95} reported a case of suppurative iridochoroiditis, in a man 31 years old, which was cured by subconjunctival injections of bichloride, mercurial inunctions, and injections of pilocarpine, with atropine and hot compresses. Visual acuity was completely restored. The only assignable cause was the occurrence of a bleunorrhagia (urethro-conjunctival) three years previously.

A case of bilateral panophthalmitis following pneumonia has been seen by Leplat.²⁹³_{Oct., '94} Abscesses in the joints preceded the ocular infection. Death ensued four days after the appearance of the inflammation of the eyes. An instance of tuberculosis in which the iris of the right and the choroid of the left eye were involved is reported by Gutmann, of Berlin,²⁵⁴_{Aug., '95} in a 6-month-old boy. The tumor in the right iris had gradually invaded and obliterated the pupillary area and penetrated the sclera, resulting in phthisis bulbi. This produced great pain, necessitating enucleation of the globe. The child died of measles four months after it was first seen. The diagnosis of tuberculosis was confirmed by post-mortem findings of tubercular lesions and bacilli in other parts of the body, though no bacilli could be seen in the eye itself, which the author believes was due to the post-mortem hardening of the organ in Mueller's fluid. He reports five cases of sarcoma of the choroid, in three of which enucleation was performed while the patients still had nearly normal vision in the affected eyes. In the remaining two cases the patients were blind. In none of these the growths recurred. In one of the latter cases, in which the sarcoma had penetrated the sclera, the patient died within three years, of sarcoma of the liver. Microscopical examination in every case revealed the growth to be a pigmented, spindle-celled sarcoma of the choroid. Coppez, of Brussels,⁸⁶⁸_{Oct. 13, '94} has seen a case of tuberculous iritis in a young woman, aged 17, who presented numerous lesions, in series, affecting the superficial tissues of all portions of the body. Denti, of Milan, and Rombolotti, of Pavia,³⁰_{Jan., '95} cite three instances of primary tuberculosis of the uveal tract. The first was seen in a girl, aged 13, whose family and personal histories were negative and who had no glandular swelling

of any kind. At first the affection of the right eye presented the symptoms of an ordinary, but stubborn, case of plastic iritis. Later the iris was found to be studded on its ciliary margin with small nodules of a yellowish-gray color, which varied in size from that of a millet-seed to that of a pin-head. In the lower segment of the iris, occupying the angle of the anterior chamber, there was a grayish-yellow mass, which was apparently composed of a confluence of nodules. The nodules as well as the larger mass were vascular, but the cornea on its lower segment was overrun by minute vessels, which proceeded from the limbus and presented numerous grayish, punctiform exudations situated upon Descemet's layer. The eye was not painful nor tender. There was no photophobia nor lachrymation. Tension was slightly minus. Vision equaled the ability to count fingers at thirty centimetres. The pupil was partially occluded by exudation. As antisyphilitic treatment proved ineffectual, a diagnosis of tubercle was made, though there were no signs of general tuberculosis. Four months later the disease-process began to resolve, and two months after that all signs of irritation had disappeared. The cornea was slightly cloudy and the anterior chamber was almost abolished. The nodules in the eye were re-absorbed, their location being marked by atrophy of the stroma. The larger mass was much reduced in size. At this time vision equaled light-perception and intra-ocular tension had fallen to —1. Three months later the mass had completely disappeared. The vision was quantitative. A localized tubercular bone-lesion in the hand had developed in the meantime.

The second case was that of a girl of 18 years, with a tubercular history on the mother's side. The eye trouble had appeared about a year and a half previously, but had not been treated. When first observed the iris in the left eye was discolored, and in its lower third there was an advanced degree of atrophy. The pupillary margin appeared notably swollen. At the point of greatest atrophy, a small nodule, yellow in color and of the size of a pin-head, could be seen projecting into the anterior chamber, and was seemingly adherent to both the iris and Descemet's membrane. No other nodules were visible. There were traces of numerous posterior synechiæ, and the pupillary space was veiled by a thin, grayish exudation. Tension equaled —1. Vision was reduced to scarcely light-perception. No pain was present. A slight amount of photophobia and lachrymation could be noticed. The nodules fused together into a larger mass, which finally invaded about the lower two-thirds of the pupillary area. Three months after the first operation the eye was enucleated upon

account of pain. Koch's tuberculin had been previously tried by injections. There was marked general reaction, but no effect locally. Some of the material obtained from the enucleated eye was introduced into the anterior chamber of the eyes of a guinea-pig and a rabbit, causing first a gradual re-absorption of the material introduced, with no marked reaction, the eye apparently returning to the normal in ten to fifteen days. Six or seven days later a tubercular process took place in the irides, showing the characteristic signs. On autopsy of these animals the pleura was found to be studded with tubercle, Koch's bacillus being found, though absent from the inoculating material. The eye showed that the tumor was composed of typical confluent tubercles, which extended from the margin of the iris to nearly the equator of the bulb, merging there into the choroid. Its thickness was about three to four millimetres at its middle portion. The retina was detached. The cornea showed infiltration, with lymphoid cells, so that Descemet's membrane could no longer be differentiated. The anterior chamber was reduced to a narrow fissure. The author thinks that the morbid process had its origin in the ciliary body, extending thence to the ciliary zone of the iris, the former becoming finally detached and pushed back, together with the iris, into the interior of the eyeball.

The third case was that of a boy, 8 years old, with a history of tuberculosis on the mother's side. When seen the eye affection had been present some months. The ciliary vessels of the right eye were injected and the conjunctiva was inflamed only in the portion included by the internal and superior recti. Just inside of the insertion of the superior rectus a slightly-raised area was observed, which was brick-red in appearance and nearly circular, looking like a scleral ectasia. The cornea presented numerous small opacities in Descemet's layer, principally in its lower part. The iris appeared darker in color than that of the other eye. There were numerous posterior synechiæ, and the pupillary area was occluded by exudate and pigment-deposits. In the upper third of the iris a yellow mass which corresponded in position to the ectasia of the sclera projected a little way into the angle of the anterior chamber. Tension was minus. Vision equaled fingers at thirty centimetres. There was neither pain nor tenderness. As all therapeutic measures had been unavailing, enucleation was performed. Inoculations with the material obtained from the eye were made into the anterior chamber of two rabbits, with results identical with those in the second case. Koch's bacilli could not be found in the new growths of the enucleated eye. The authors explain their absence by stating that in old tubercles the bacilli

either lose the property of being stained by the method now in use, or that they are destroyed, leaving spores. On examination of the enucleated eye, it was found that the new formation had evidently started in the ciliary body, disintegrating and raising the sclera and drawing the iris after it, thus forming a coloboma in its upper portion.

Guende, of Marseilles, ¹⁷¹_{May, '95} reports three cases of congenital ophthalmoplegia externa. In one there was double ptosis with almost absolute fixation of the eyes in the external angle of the lids; there was myosis without reaction to light; accommodation was normal. He thinks that the affection in this case was due to a lesion of the posterior nuclei of the third and fourth pairs of nerves, without any disturbance of the underlying nuclei of the third ventricle. In a case of left-sided traumatic ophthalmoplegia, Gutmann, of Berlin, ⁴_{Oct. 8, '94} has operated upon the existing ptosis by Panas's method. He also advanced the internus rectus and cut the externus. After six months, upon account of secondary divergence, advancement was required upon the externus, and the internus was tenotomized. After three years' time the patient had binocular vision in the primary position of the eyes, diplopia becoming manifest when the eyes were directed above and below. Two interesting cases of complete external ophthalmoplegia, without involvement of the intra-ocular muscles, and with normal fundus, are detailed by Maginelle, ²⁴³_{Mar., '95}. The affection was congenital and occurred in brothers. Another brother was said to have had the same affection. There was no distinct history of hereditary syphilis, but the father was an alcoholic. In the opinion of the author the lesion was nuclear.

A case of associated paralysis for lateral movement to the left, in a syphilitic subject in whom the right internal rectus was paralyzed, while the left external rectus was intact, has been studied by Sauvinau, of Paris, ¹⁴_{May 19, '95}. There was right ptosis. All the other muscles were normal. The writer places the lesion in the course of the inosculating fasciculus from the sixth nucleus to the internal rectus nucleus of the opposite side, on a level with the levator nucleus, which was involved, thus giving a nuclear paralysis of the levator and peripheral conjugate paralysis of the internal rectus. The associated rectus was not only intact, but even spasmodic in its action. De Spéville, ¹⁷¹_{Apr., '95} has seen total paralysis of the third nerve, on one side, in a healthy child without syphilitic history, who had had measles two years previously. Recovery rapidly followed the administration of potassium iodide and mercurial inunctions. In regard to the cause of the affection the writer advances the hypothesis of some undetermined infectious

process. Chauvel, of Paris, ¹⁷³_{Apr., '95} reports 39 cases of paresis and paralysis of the third nerve. In 20 cases the right eye was affected, in 18 the left, and in 1 both eyes. In 38 out of 40 eyes the visual acuity was above one-fourth, this being in marked contrast to the amblyopias seen in functional strabismus. Two cases of pronounced posterior staphylomata were present. The visual field was normal in 17 out of 24 cases. Twenty cases were emmetropic, 6 hypermetropic, and 6 myopic. Six were regularly astigmatic. Diplopia and divergent strabismus were constant. Ptosis appeared in 27 and mydriasis in 23 cases. As exceptional symptoms there were exophthalmos (3), myosis (2), hemiplegia (3), buzzing in the ears (5), and perforation of the palate (1). Syphilis was found to be the cause in 20 cases. Ataxia, cerebral congestion, convulsions, tuberculosis, and traumatism were also noted. In the treatment of this condition the combined use of mercury and potassium iodide was of the most value. Mercury by inunction was generally used, and in a few cases the drug was administered by hypodermatic injections. In addition, sulphate of strychnia was given hypodermatically, and weak, constant currents of electricity were employed with some benefit. Pilocarpine, hypodermatically, proved of no value. The same author ¹⁷³_{Apr., '95} has observed paralysis and paresis of the sixth nerve in 30 cases. In 15 the right eye was affected, in 8 the left, and in 7 both eyes. Visual acuteness was normal in 16 cases, and was reduced from one-half to one-fourth in 13. In 2 cases of high myopia there was pronounced posterior staphyloma in one and atrophy of the choroid around the papilla in the other. In 11 cases out of 20 the visual fields were reduced. Of 31 eyes 21 were emmetropic, 2 were hypermetropic, and 8 were myopic. Regular astigmatism was present in 6 eyes. Homonymous diplopia was recognized in 28 cases; myosis occurred in 11 and mydriasis showed itself twice. Among the causes syphilis ranked first, followed by acute mania, fracture of the base of the skull, ataxia, scarlatina, alcoholism, arterio-sclerosis with nephritis, and aortic aneurism. The complications were hemiplegia, mania, ataxia, arterio-sclerosis, aortic aneurism, ptosis, otitis media, facial neuralgia, and angina pectoris.

A case of recurrent oculo-motor paralysis, in a man 41 years of age, has been carefully studied by Knapp, of Boston. ⁹⁰_{Sept. 27, '94} The attacks consisted of a paralysis of all the branches of the left third nerve, ushered in by pain, nausea, and vomiting, and attended by anæsthesia in the upper two divisions of the fifth nerve. The first attack lasted seven weeks, with probably complete recovery, while the second was not entirely recovered from at the end of five

months. The iodides proved intolerable and inefficient. Westhoff¹⁷¹_{Mar., '95} cites an instance of paralysis of the right sixth nerve appearing on the third day of a pneumonia, in a child 2 years of age. The muscle disturbance increased, though the condition was recovered from with the pneumonic consolidation. Moulton, of Fort Smith,²⁴⁹_{July, '95} has seen another case, this occurring in a boy 11 years of age. On regaining consciousness, ten days after a fall on the head, diplopia and unilateral deafness were complained of. When seen by the author, six weeks later, there was complete paralysis of the right facial, auditory, and abducens nerves.

Guillery, of Cologne,²⁵⁴_{Nov., '94} has found that the ocular muscles frequently exhibit latent insufficiency in ataxic cases. As there is no diplopia or restriction in the ocular movements, the author employs the Maddox rod for their detection. A case of post-diphtheritic paralysis of both sixth nerves is reported by Denig, of Würzburg.³⁴_{Aug. 27, '95} This condition only follows severe cases of diphtheria, whereas paralysis of accommodation may occur after mild attacks. Lagrange, of Bordeaux,¹⁷³_{Jan., '95} reports a case of monocular diplopia of hysterical origin in a girl, 12 years old, who showed no other symptoms of hysteria. After eliminating all errors of refraction, both static and dynamic, capable of explaining the condition, the author classes it with those reported instances in which the phenomenon was of cortical origin. Esson,¹¹⁷¹_{Jan., '95} has observed narrowing of the palpebral fissure in a case of recovering peripheral facial paralysis resulting from a fall, in a man 25 years of age. There was loss of power and clonic contraction in all the muscles of the affected side. Electrical tests showed the presence of recovering paralysis and partial degeneration in the muscles. Baas, of Freiburg,²⁰⁴_{B. 40, H. 5} thinks that degeneration of the muscles of the eye is due to a chronic myositis in which an hyperplasia of the connective tissue replaces the degenerate muscle-tissue. This condition is dependent upon an abnormal condition of the blood.

Chauvel, of Algiers,¹⁷³_{Mar., '95} gives the result of comparison of 20 cases of nystagmus. In 17 it was bilateral, in 1 the right eye was affected, and in 2 the left eye. Heredity was found not to be a factor in its production. Twice the condition was thought to be due to typhoid fever, but, as a rule, it appeared in infancy. In 83.8 per cent. visual acuity was reduced to less than one-third; in 43.3 per cent. it was reduced to less than one-sixth; in 66 per cent. the visual field was normal. Of the 37 eyes examined 18 were emmetropic, 15 were myopic, and 4 were hypermetropic. Regular astigmatism was present in 13 cases (a little more than one-third). In 26 cases there was no complication. Twice there was suppurative dacryocystitis, twice general atrophy of the choroid, and 4

times pronounced posterior staphyloma. In 15 cases the nystagmus was oscillatory; in 5 it was rotatory. McGillivray, of Dundee, ⁷⁶_{Aug., '95} has noted a case of hereditary congenital nystagmus associated with head-movements. The affection was traceable with certainty through four generations, involving eight persons, and the author states that there is reason to think that it appeared two generations earlier. The second generation escaped. The transmission, with one exception, was through the females, although six males and but two females were affected. The same author records four cases of lateral nystagmus in a family of nine children. In one child there were associated head-movements. In all four cases there was well-marked astigmatism.

Duane, of New York, ²⁴⁹_{Jan., '95} records a case, seen by Knapp, of the same city, of permanent scotoma caused by looking at the sun during an eclipse. The patient, a man 24 years of age, stated that twelve years previously, soon after viewing the transit of Venus, he found that a greenish cloud completely hid the centre of every object. This cloud had exactly the shape of the illuminated sun at the time of the transit (a circle with a crescentic effect at the upper part corresponding to the spot occupied by the planet at the time). The scotoma, which was in the field of the left eye, was at first quite large, but gradually decreased in size, always, however, retaining the same shape. At times he was subject to attacks in which the entire lower half of the field of vision of the right eye was abolished. In the course of ten or fifteen minutes this area shifted its place so as to occupy successively the temporal, the superior, and lastly the nasal half of the visual field, and then disappeared. These symptoms were succeeded by a dull, fronto-temporal, left-sided headache, which lasted for twelve hours. There was absolutely no abnormality in the optic disc or macula.

Violet, of Paris, ¹⁷³_{June, '95} details a case of retinal hæmorrhage, in a patient giving a family history of hæmophilia for four generations. The right eye, blind for eight years, showed the remains of an old hæmorrhage into the vitreous. In the left eye there was a small, recent hæmorrhage of the retina, with apparently miliary aneurisms on the retinal artery. Recovery of sight, in the left eye, was attained by absolute rest, milk diet, and the administration of iodide of potassium internally. Galezowski, of Paris, ¹⁷¹_{Apr., '95} has seen localized retinal hæmorrhages in three patients giving a previous history of influenza.

In the etiology of abnormal developments of the eye, Weiss, of Mannheim, and Oettinger ²⁵¹_{Dec., '94} have found circulatory changes in the retina of the mother producing hemeralopia during the period of pregnancy. The authors believe that this circulatory change, acting

also upon the foetal eye, produces the faulty development. Trantas, of Constantinople, ¹⁷³_{June, '96} reports annular scotoma, in a case of typical pigmentary retinitis, of probable syphilitic origin. Two examples of marked anatomical changes in the fundus, as the result of the presence of intestinal worms, have been reported by Meurer, of Wiesbaden. ³⁵³_{Nov., '94} In both of these instances there was considerable disturbance of vision, which was occasioned by a moderate swelling of the disc. Vision improved rapidly after disappearance of the parasites. The author attributes the ocular affection to an increase in the intra-cranial tension, induced indirectly by changes in the circulation by the reflex irritation of the intestinal sympathetic. It is believed by Tschelmoslow, of Kronstadt, ²¹_{Dec. 29, '94} that retinal hæmorrhages in pernicious anæmia due to tape-worm are caused by diapedesis, and are rapidly absorbed. The extravasations which occur in most cases are found about the disc and macula, but are rarely perceived by the patient and are accompanied by ampulliform enlargements and aneurisms of the retinal arteries.

Berger, of Paris, ⁷⁸_{Nov. 30, '94} has recorded an instance of syphilitic retinitis which was followed by atrophy and permanent diminution of vision, although there had been previously a slight improvement following the administration of mercury. The case was that of a young woman who had nephritis, which was presumably of syphilitic origin. The author points out that retinitis occurring in renal disease should not be necessarily considered of albuminuric origin, but that its true cause should be sought and treated accordingly. In the early stages of retinitis albuminurica gravidarum, Silex, of Berlin, ⁴_{May 6, '96} has noticed a peculiar, golden-yellow, shining reflex, of varying width, always greater than the normal, upon the retinal artery, and a similar appearance in syphilis and arterio-sclerosis of the internal carotid. Retinitis albuminurica gravidarum may be further distinguished by its more numerous hæmorrhages and attacks of blindness which are due to uræmia. He insists on emptying the uterus as soon as symptoms of retinitis appear, and advises the prevention of future pregnancies to prevent relapses. Webster, of New York, ⁵⁹_{Oct. 20, '94} gives notes of four cases of retinitis from chronic diffuse nephritis. In none of the cases was albumin present in the urine, the diagnosis being based upon the presence of casts and other abnormal constituents of the urine. With a view of determining the average duration of life after the appearance of retinitis from renal disease, exclusive of cases following scarlet fever and pregnancy, Belt, of Washington, D. C., ¹⁰¹⁸_{July, '96} has obtained data from numerous ophthalmologists, with the following results: Of 155 cases in private practice 62 per cent. died within one year, 85 per cent. in two years, and 14 per

cent. in more than two years. Of 77 hospital cases 85 per cent. died within one year, 93 per cent. within two years, and 6 per cent. lived more than two years. Of 187 mixed cases 65 per cent. died within one year, 93 per cent. within two years, and 6 per cent. lived more than two years. In the total number of 419 cases 72 per cent. died within one year, 90 per cent. within two years, and 9 per cent. lived longer than two years. Van Fleet, of New York, ^{May 11, '95} states that, in his experience, the occurrence of retinitis albuminurica with chronic Bright's disease indicates death within a period which may be predicted with some degree of certainty, but that in acute kidney disease, although its occurrence is of the gravest significance, there is a chance of saving life. The same author directs attention ⁸¹⁴_{Nov. 1, '94} to the fact that, although the law gives to the mother the right to save her own life even at the sacrifice of her child's, and also gives to the physician the right to aid her in this particular, it gives her no right to attempt an abortion to save her eyesight, and makes it a crime for a physician to even advise it for this purpose.

Parinaud, of Paris, ¹⁷¹_{July, '95} makes a contribution to the study of optic neuritis of intra-cranial origin, based in part on the recent histological work of Rochon-Duvigneaud. The author rejects the theory of Schmidt and Maunz, that neuritis is due to the dilatation of the nerve-sheaths caused by intra-cranial pressure, stating that in order to produce alterations in the papilla the fluid accumulated in the sheath would have to pass through the lamina cribrosa, while he has found, experimentally, that even with a pressure of fifteen centimetres of mercury for twelve to twenty-four hours, he has been unable to cause liquid injected into the sheath to pass through the lamina. He has also been unsuccessful in producing neuritis by raising the intra-cranial pressure artificially, and considers it doubtful, besides, whether in man the intra-cranial pressure can be maintained elevated considerably above the normal sufficiently long without endangering life. Though hydrocephalus is generally accompanied by optic neuritis, the latter must be due not to increased pressure, but to the œdema of the brain which it causes, or, at least, which accompanies it. Besides, in neuritis a certain degree of visual acuity is maintained, while in hæmorrhages of the sheath blindness precedes all ophthalmoscopic signs, which would tend to exclude the theory of increased pressure. Taking up Deutschmann's theory of the infectious origin of neuritis, the author points out the fact that, in cerebral tumors which are not infectious, optic papillitis is present in almost every case; while tubercular meningitis is accompanied by it only in less than half the cases, and that papillitis may result even from a serous cyst of

the orbit. He also points out that many cases of cure of optic neuritis have been reported from simple trephining, without any medication or removal of the cerebral tumor. He believes in two kinds of neuritis,—one inflammatory, resulting from meningitis, etc., and another of œdematous origin. Optic neuritis of intra-cranial origin is primarily a lymphatic œdema of the nerve, produced by the same influences and mechanism as œdema of the cerebral substance, of which the optic nerve is a part. It is most frequently associated with hydrocephalus, but it does not necessarily imply the existence of dropsy of the ventricles, since an increase of intra-cranial tension seems incapable of producing, of itself, an œdema of the papilla. The author explains the inflammatory character of the tissues found in optic neuritis by Rochon-Duvigneaud, in his histological researches, by producing a stasis in the circulation of the nerve, finally giving rise to a true inflammation, which is manifested by a proliferation of the neuroglial cells. Duvigneaud has found that the lesions predominate in the papilla and intra-cranial portion of the nerve, while the orbital portion is relatively free. Parinaud explains this by contending that the scleral ring acts as a ligature around the œdematous nerve, while the orbital portion is protected by the distension of its sheath, acting as a compression bandage. The intra-cranial portion, not being thus protected, suffers more in proportion from the œdema.

A case of choked discs from chronic meningitis, demonstrated by post-mortem examination, is reported by Webster, of New York, ¹⁰⁰⁷_{June, '95} in a man 28 years of age. When first seen central vision was reduced to $\frac{20}{100}$ and there was subnormal color-perception. Later there was complete blindness, inability to stand without assistance, intense headache, a sense of fullness in the head, constipation, trouble in micturition, and difficulty in conversing. The patient died sixteen months later in coma following convulsions. Post-mortem examination showed several points of lymph in the dura mater of the vertex. The convolutions were flattened and the surface of the brain was smooth. The dura mater was adherent at and for a small area around the exudate. The ventricles were enormously distended with a clear serum. Dabney, of Louisville, ⁷¹_{Nov., '94} gives the notes of two cases of optic neuritis of cerebral origin. The first was that of a man, 31 years of age, who had contracted syphilis fourteen months previously. When first seen there was blindness of the right eye associated with optic neuritis. One week later the nerve in the left eye became similarly affected. The general symptoms were headache and vertigo. Despite active treatment, the patient died in about four weeks. In the second case there was double optic neuritis with paresis and epileptic con-

vulsions affecting the right side. Hearing was abolished on the left side and impaired on the right side. Intense pain in the left side of the head and face and at times in the neck was complained of. During the convulsive attacks the head was drawn downward and to the right side, while the eyes were turned upward and outward. The skull was trephined over the right parietal prominence and $2\frac{1}{2}$ ounces (77.5 grammes) of fluid were drawn from the lateral ventricle. Temporary improvement followed the operation. The patient died two months later. Post-mortem examination showed tubercular deposits in the pia mater and in the fourth and left lateral ventricles.

Panas, of Paris, ¹¹⁵³_{Feb. 23, '95} cites an example of double optic neuritis and atrophy in one eye, occurring in a young man 22 years of age, suffering from chronic gonorrhœa. The author considered the ocular condition to be directly due to the gonorrhœa.

De Schweinitz and A. G. Thomson, of Philadelphia, ²⁴⁹_{Apr., '95} report an interesting instance of a second attack of papillitis. The patient was under observation for four years. When first seen he had a focal epilepsy with passive hyperæmia of the retinal circulation and infiltration of the lymph-sheaths. One year later choked disc developed and continued four months subsequent to a trephining operation performed with the expectation of finding a removable growth, when atrophy began and progressed until almost complete. In the macular region of both eyes there were changes which closely resembled those seen in renal retinitis. Vision remained good in the right eye, but was greatly reduced in the left. The patient continued well for nearly one year, when there was a return of the cerebral symptoms and of the choked disc, the swelling of the nerve-head being as great as during the primary attack.

Croskey, of Philadelphia, ²¹²⁹_{v. 1, No. 1} cites an instance of severe, constant, "splitting" headache, associated with a low-grade neuritis and diminished visual acuity, occurring in a single woman, aged 27 years, in which the application of wet cups to the base of the skull gave almost instant and permanent relief. A case of quadrisectoral homonymous hemianopsia is reported by Weymann, of St. Joseph, ³⁴⁷_{Oct., '94} in a man who had acquired syphilis. Following severe and long-continued headache, the patient became unconscious, and upon recovery was found to be paralyzed on the right side. Four months later, vomiting, loss of memory, mania, incontinence of urine and fæces, difficulty in speech, with paralysis of the oculomotor nerves on both sides, appeared. The optic nerves were blanched, and the visual field showed large, triangular, absolute scotoma up and in, down and out, from fixation in the right eye,

and up and out and down and in in the left eye, but not including fixation. Under large doses of potassium iodide (2 ounces—60 grammes—per diem) the patient rapidly improved, but the scotoma remained unchanged. The author places the lesion in the back part of the internal capsule, implicating both occipital lobes.

Mouisset²¹¹_{Jan. 13, '95} has seen left lateral hemianopsia and hemiplegia, in a woman aged 69, with double mitral disease. Death soon ensued. The autopsy showed embolic softening of the cortex, at the anterior end of the calcarine fissure, and a sub-cuneal cavity, involving the deeper layers of the gray and the white matter, under the entire cuneus. The author considers the hemiplegia to have been also cortical and due to embolism. A case of syphiloma of the optic chiasm, producing bilateral temporal hemianopsia has been observed by Nummack,⁵⁹_{Feb. 9, '95} in a man 34 years of age, who, six weeks after the appearance of the initial lesion, was affected with right hemiplegia. Specific treatment was continued over a period of four years, but four weeks after cessation headaches developed and the visual disturbances were again noted. The defect in the field did not include fixation. Recovery in less than a year's time followed the energetic use of antisiphilitics.

Abelsdorff, of Berlin,²⁵⁴_{Aug., '95} thinks that all cases of bitemporal hemianopsia should not be considered as due to lesions of the optic chiasm unless other symptoms of central disease are present. He relates two cases, one of which began with headache, dizziness, vomiting, and a greatly-lowered sense of smell. The visual disturbances first manifested themselves as a lessening of central vision of both eyes and a defect in the left temporal field, which was soon followed by a complete bitemporal hemianopsia, though the ophthalmoscopical appearances of the eyes remained normal. Central vision gradually increased. The left vision rose from one-eighth to one-fourth, while the right became normal. The right temporal field for white was restored to a large extent. The author believes that the lesion was due to the pressure of an enchondroma upon the optic chiasm and the olfactory nerve. The second case was seen in a 26-year-old woman, in whom optic atrophy and a lessening of visual acuity had been noticed three years previously. Besides a greatly lessened central vision and optic atrophy, the patient had bitemporal hemianopsia. The author thinks this condition originated in a chronic inflammatory process, because of the optic atrophy and the presence of a central scotoma for red and green in the left eye and a veiling of the lamina cribrosa in the fellow-eye. The visual disturbances began shortly after the development of amenorrhœa. Spanbok and Steinhaus¹⁷³_{Apr., '95} cite a

case of coincident heteronymous temporal hemianopsia and diabetes insipidus of syphilitic origin, cured by a mixed treatment of mercury and iodide of potassium. The two conditions were entirely independent and due to two distinct lesions,—one in the floor of the fourth ventricle, producing the diabetes insipidus; the other at the optic chiasm, causing the hemianopsia.

A case of binasal hemianopsia has been observed by Eales, of Birmingham, ⁷⁶_{July, '95} in a man 75 years of age. Failure of sight followed a prolonged period of ill health caused, eighteen months previously, by whitlow. Hearing had been failing for two years, probably from labyrinthine disease. The nerves presented a grayish-yellow, filled-in appearance, but there were no signs of atrophy. The visual field in the right eye was limited almost to the lower outer part, where it was greatly contracted and extended about ten degrees above the horizontal meridian. In the left eye there was an irregular quadrant remaining down and out, including fixation, and extending to forty degrees above the horizontal meridian in the periphery. In both eyes the dividing line was beyond fixation; later, however, greater contraction followed, the dividing line in the left being still on the nasal side, but that in the right eye having receded except at fixation. The nerves now showed very slightly the appearance of atrophy, principally at the outer half. The "hemianopic pupil" existed in each eye; the vision in the right eye equaled the ability to see to count fingers at one foot and in the left eye vision equaled $\frac{6}{6}$. Abelheim ³¹_{Dec. 19, '94} reports a case of inferior horizontal hemianopsia, in which there was atrophy of the superior half of the disc. The action of the irides was slightly impaired when light was thrown from the blind portions of the field. The condition was accounted for by a neuritis of the upper halves of the nerves.

Zimmermann, of Milwaukee, ²⁴⁹_{Jan., '95} gives notes of five cases of syphilis of the brain. The first was seen in a man 62 years of age. There was right hemiplegia with amnesic aphasia, right hemianopsia, and micropsia. The hemianoptic defect was at times complete for white and occasionally there was hemiachromatopsia. Later papillitis with hæmorrhages appeared. The autopsy showed, in the left hemisphere, a diffuse growth starting from the meninges, involving the frontal and temporal lobes, optic tracts, pons, middle and posterior cerebral arteries, and third nerve. There was a large focus of softening in the corpus striatum. The third case, in a man 32 years old, was one of crossed hemiplegia affecting the limbs on the right side and the face, together with the entire third nerve on the left side. In the fourth instance there was right hemiplegia with paresis of the right internus, ptosis, and myosis,

in a man 37 years of age. The fifth case was that of a man, 34 years of age, with paralysis of the right abducens. In this case there was an irregular hemianoptic defect in the right fields and topographical ideation was somewhat affected. Galezowski, of Paris, ¹⁴_{Apr. 28, '96} strongly recommends mercurial inunctions in syphilitic optic atrophy and oculo-motor nerve-lesions as the only useful remedy, having found potassium iodide to be of no value.

Chibret, of Clermont-Ferrand, ¹⁷¹_{May, '96} believes that parenchymatous keratitis and exudative choroiditis have a common origin in hereditary syphilis and that both are equally influenced by mercury. Parenchymatous keratitis, however, does not constitute a special manifestation of hereditary syphilis, but is observed more frequently in syphilitic children because such children are more exposed than syphilitic adults to corneal affections. Influenza is an important etiological factor, old syphilitics being liable to relapses after attacks of this disease.

Galezowski, of Paris, ¹⁷³_{Mar., '96} summarizes the eye-lesions found in hereditary syphilis as follows: 1. Malformation of the protecting membranes of the eye, more particularly of the lid, orbit, and lachrymal canal. 2. Paralysis of the motor nerves of the eye, with ptosis and nystagmus. 3. Arrest of development,—microphthalmos, astigmatism, etc. 4. Alterations in the internal membranes of the eye, with amblyopia and amaurosis; choroiditis; pigmentary retinitis, with atrophy of the papilla; cataracts, etc.

The same author ¹⁷³_{Feb., '96} believes that many syphilitic lesions of the eye, usually classed among the secondary symptoms (notably iritis and choroiditis), should be placed in the tertiary period, the lesions of which period are as follow: 1. Caries of the nasal fossæ, the result of ozaena, often followed by affections of the lachrymal canals, exophthalmos, and optic neuritis. 2. Confluent syphilide of the face and eyelids, following soon after the appearance of the chancre. 3. Gumma of the sclera (pericorneal) and gumma of the iris. 4. Choroiditis, pigmentary retino-choroiditis with or without hemeralopia. 5. Gumma of the chiasm, producing neuritis and atrophy of the papilla. 6. Hemianopsia, homonymous or crossed, with disturbed memory, scotoma, dyschromatopsia, and optic neuritis. 7. Locomotor ataxia with atrophy of the papilla and paralysis of the motor nerves of the eye.

In the treatment of these tertiary lesions he employs inunctions of mercury, 2 grammes (31 grains) daily for two years consecutively, using iodide of potassium for the elimination of the mercury in those cases where the mercurial intoxication has gone too far, and beginning the inunctions as soon as the symptoms of mercurial poisoning disappear. Deschamps, of Grenoble, ³¹_{June 6, '96} has

seen a case in which vision of $\frac{3}{10}$ and contraction of the formed color-field occurred in a subject of diabetes with a doubtful history of syphilis. The affection recurred repeatedly, although the exacerbations were relieved by mercurial inunctions.

Leplat¹¹⁵³_{June 15, '95} lays stress on the frequency with which ocular and orbital affections follow dental diseases. Risley, of Philadelphia,¹¹⁹_{June 29, '95} calls attention to the fact that lithæmia is both a primary and modifying factor in many of the discomforts as well as the more serious diseases of the eye. He cites instances of conjunctivitis which failed to yield to local treatment, but subsided rapidly under full doses of salicylate of soda and a purge.

From his own experience and from the literature of the subject, Pooley, of New York,³⁴⁷_{May, '95} concludes: 1. That the eye complications following grip are comparatively rare,—a fact which becomes apparent when we remember the immense number of cases of grip which have occurred during the past five years and the exceedingly small number of cases of eye trouble reported. 2. Many of the cases reported as due to grip are fanciful and need more substantial proof. 3. Grip may affect the eye by inflammatory process or by invasion of the accessory sinuses. 4. It may affect the nervous tissues. 5. The inflammatory affections involve especially the conjunctiva, the uveal tract, tissues of the orbit, and perhaps the fibrous capsule of Tenon. 6. In some of these cases the extension is by continuity and in others by metastatic or embolic processes. 7. The nervous apparatus of the eye is especially liable to become involved by paresis of accommodation or of the extrinsic muscles of the cervical sympathetic, by papillitis and retrobulbar neuritis, and also anæsthesia of the cornea may occur. 8. Before assigning grip as a cause of any of the eye complications enumerated, careful and thorough scrutiny are necessary to exclude other causes, especially in affections of the nervous tissue,—syphilis, tobacco, alcohol, etc. Valude, of Paris,¹⁷¹_{Apr., '95} has seen an instance of ischæmia of the retina and optic atrophy consequent upon a traumatism of the heart. The case was that of a healthy man, whose chest had been compressed between a moving wagon and a building. Three weeks later, vision, which had been good prior to the accident, was reduced to the ability to count fingers. The eye-grounds had a woolly appearance, most marked in the macular regions, which themselves were red and surrounded by a distinct halo. The arteries, which were bloodless, were small and thread-like. The veins were filled with dark blood. At first the nerves presented a normal appearance, but very soon became atrophic.

Berger, of Paris,³¹_{Nov. 21, '94} has seen sensory disturbances of the

globe and about the eye in 5 cases of locomotor ataxia. The conjunctiva and cornea were found to be affected alone or in combination. There was thermal anæsthesia in 1 case, imperfect localization in 3, and a probable history of paræsthesia of the conjunctiva in another. In a case of unilateral syringomyelia, Violet, of Paris, found ¹⁷³_{Sept., '96} a diminution of the palpebral slit, retraction of the globe, and myosis on the affected side. These symptoms resemble those produced by the section of the cervical sympathetic, and are due partly to paralysis of the smooth muscle-fibres of Müller in the lid and orbital aponeurosis, and partly to paralysis of the dilator of the iris. The lesion had evidently involved the cilio-spinal centre of Budge. Angiéras, of Laval, ⁷⁸_{Mar. 31, '95} has seen a case of exophthalmic goitre in which all the symptoms, except the tachycardia and insomnia, were relieved by the administration of 2 grammes (31 grains) of salicylate of sodium daily. A case of exophthalmic goitre with monocular symptoms and unilateral thyroid hypertrophy on the opposite side to the ocular disturbance has been seen by Fridenburg, of New York, ²_{July 12, '95} in a married woman 24 years of age. There was an insufficiency of the interni of five degrees for near.

Cutler, of New York, ²⁵⁴_{Apr., '96} has reported 5 cases of congenital hemeralopia, 4 of which were in the male members of several generations of one family. The eye-grounds were normal and the hemeralopia remained stationary. Of 54 cases thus far reported, existing in ten families and two individuals, the author found that 36 were in males and 18 in females. In two families only the males were affected, though both male and female members transmitted the affection. The author believes congenital hemeralopia to be caused by a malformation of the deeper layers of the retina, probably of the pigment epithelial layer. A severe case of xerosis epithelialis associated with hemeralopia has been observed by Aschenbach, of Marburg, ⁴_{June 17, '95} in a boy of 9 years, who was badly nourished and had been accustomed to drinking half a glass of whisky daily. Under nutritious diet the xerosis and hemeralopia disappeared in a short time. The left eye recovered with a central corneal opacity. The right eye had been previously destroyed.

An instance of a gradual, but total loss of vision has been seen by Valude, of Paris, ¹⁷¹_{Feb., '96} in a girl 14 years old. The pupil was dilated and the superior lid was anæsthetic. That these symptoms were excited by the presence of a small roll of paper under the lid was noted by their subsidence consequent upon the removal of the foreign body. The author views the case as being one of hystero-traumatic amblyopia. Duboys de Lavigerie, of Paris, ¹⁷¹_{Apr., '96} reports a case of amblyopia, appearing at the eighteenth

hour of a twenty-four-hour bicycle-race, in a professional rider 24 years old. Both corneæ were diffusely hazed, but without superficial lesion. By means of hot applications the patient regained normal vision in one day's time. The writer thinks that the trouble was induced by the excessive cold weather in which the race was run.

An instance of peculiar perversion of the color-perception is recorded by H. E. Smith, of Norwich, N. Y. ⁵⁹_{Mar. 9, '95} A healthy male child, 11 years of age, was stricken with inco-ordination in gait, occipito-frontal headache, formication, and tingling in the arms, fingers, and along the course of the upper dorsal nerves. There was a dull ache in the lower cervical and upper dorsal regions, and pain during mastication. Visual disturbances, consisting in micropsia, metamorphopsia, monocular polyopia, and the perception of colors in their complements, appeared. There was a low-grade neuroretinitis with limitation of the visual fields. Under the use of potassium iodide all of the symptoms gradually disappeared. Powers, of London, ⁷⁷_{July, '95} has seen a case of apparent binocular hysterical blindness in a married man 21 years of age. Blok, of Rotterdam, ¹⁷¹_{Mar., '95} observed hysterical amblyopia, with central scotoma, in a young woman presenting the characteristic stigmata of hysteria, following the removal of a cholesteatoma from the mastoid. Booth ²⁴²_{Aug., '95} is of the opinion that we have in suggestive therapeutics an important harmless aid in the treatment of hysterical amblyopia and amaurosis.

A case of tobacco-amblyopia studied by Ramsey, of Glasgow, ²¹³_{Dec., '94} illustrates the fact that what at first, according to the author, is only a functional disorder or a circulatory (nutritional) disturbance may, in the course of time, lead to organic change, producing atrophy of the papillo-macular fibres. Cleeman, of Philadelphia, ¹¹²_{Mar., '95} relates the case of a physician, 53 years of age, who noticed a large red-colored scotoma occupying the upper inner part of the field of vision of the left eye. The disturbance came on suddenly and lasted several hours. The observer was in good health and of abstemious habits, rarely using alcohol and smoking tobacco moderately. Previous to the appearance of the phenomena he had been conscious of discomfort in the affected eye and had smoked two cigars in succession. Examination of the eyes showed no fundus-changes. According to Heusmann, of Göttingen, ¹³_{Feb. 15, '95} tobacco-amaurosis has been found to be the cause of the gradual blinding of Australian horses, which, it was discovered, fed on *Nicotiana suaveolens*, the native Australian tobacco. Night-blindness was the first symptom noted, absolute blindness developing in from six months to two years. At the post-mortem exam-

ination atrophy of the spinal cord and its nerves were seen, though no related symptoms were present during life.

A case of amblyopia due to dinitrobenzol has been seen by Pockley, ²⁶⁷_{Oct. 15, '94} in a man 31 years of age, presenting other marked toxic symptoms. Vision was reduced to counting fingers at about two and one-half metres' distance. The pupils were partially dilated and the irides were sluggish. Both discs were decidedly pale. There was slight contraction of field of vision, but no scotoma. Di Cerrillo ¹⁷³_{July, '95} records a case of amblyopia produced by the abuse of stramonium, prescribed for asthma. Gross ¹¹⁶_{Sept., '95} gives notes of a case of absolute blindness from optic atrophy following the ingestion of a large dose of a tæniifuge. He believes that the intoxication produced was due to filicic acid, which, Goldzieher thinks, acts peripherally on the optic-nerve fibres. Masius ⁵²_{June 29, '95} records two instances of ocular disturbance following the administration of male fern as a vermifuge. One occurred in an anæmic man, aged 28, who took 10 grammes (2½ drachms) of the ethereal extract daily for three days. This patient became suddenly blind. The other case took, first, 10 grammes (2½ drachms); then 8 grammes (2 drachms) the following day, and 8 grammes (2 drachms) two days later, with resulting blindness. In both cases the pupils were dilated *ad maximum*, the irides were immobile, and the fundus showed pallor with constriction of the arteries. One of the cases remained blind; the other regained vision $\frac{8}{200}$ in one eye and could see to count fingers at fifteen centimetres in the other. Of 4 dogs treated experimentally 2 became markedly amblyopic; the other 2 escaped.

Guibert, of Paris, ¹⁷¹_{May, '95} reports a case of aneurism of the internal carotid at the left cavernous sinus. The aneurism was caused by a fracture of the base of the cranium, as the result of a fall. The symptoms were complete ophthalmoplegia of the left eye and violent, recurring, nasal hæmorrhages, mainly from the right nostril, owing to a communication between the aneurism and the right sphenoidal sinus. The ophthalmoplegia was complete at first, but gradually disappeared during a period of three months. The fundus was normal. Physical signs were absent, and the diagnosis was only made post-mortem. Death is said to have been caused by anæmia. The notes of three cases of amaurosis after injury to the head are given by Nettleship, of London. ⁷⁶_{Apr., '95} The first was a woman 30 years of age. When 7 years of age the sight of both eyes was completely lost within two hours of an injury received over the right frontal eminence. After two weeks' time recovery of vision began, and in one month had obtained an acuity equaling its present degree ($\frac{1}{3}$ in the right eye and normal

in the left eye). Both discs were grayish pale, with fairly well defined edges; that of the left eye was not so pallid as that of the right. The vessels were normal in appearance. The second case was in a woman 50 years old. Sight in the right eye had begun to fail two days after an injury to the right temple, and was finally reduced to light-perception. There were no ophthalmoscopic changes. Hæmorrhage from the nose occurred on the sixth day, and shortly afterward vision began to gradually improve. In the third instance, in a man 30 years of age, the eye was blind and the changes resembled those of embolism. There was also paralysis of the external rectus of the fellow-eye.

Therapeutics and Instruments.

In a lecture to nurses upon the care of the eyes, Norris, of Philadelphia, ¹¹²_{July, '95} emphasizes the necessity of unrelaxing vigilance to prevent harm to the eyes, the most scrupulous cleanliness in treating them, and the greatest gentleness in handling them.

Blok, of Rotterdam, ¹⁷¹_{Mar., '95} has found, microscopically, no difference in the healing process in corneæ which have been incised with or without cocaine, and denies any effects of the drug in the healing process of corneal lesions. Parenteau, of Paris, ¹⁷³_{Sept., '95} recommends ocular massage as an adjunct to the ordinary treatment in many conditions of the eye. It is contra-indicated in leucoma, in progressive myopia with posterior staphyloma, in commencing cataract, and where there is marked lowering of ocular tension.

To limit the action of the cautery or curette to its proper bounds, Puech, of Bordeaux, ⁷⁰_{June 9, '95} highly recommends pyoktanin, in 1-per-cent. solution, as a stain in ulcers of the cornea. In 20-per-cent. solution he has found it very useful in epithelioma of the lids, although in conjunctival catarrh its employment does not appear to offer any advantages. As a preventive of inflammation after operations, and as a curative means in all forms of conjunctivitis, le Damany ¹¹⁵³_{Sept. 21, '95} employs powdered loretinate of bismuth.

Pansier, of Avignon, ¹⁰⁶¹_{Nov. 15, '94} recommends the use of galvanism in all inflammations of the uveal tract, whether old or recent, and reports 24 cases in which he had excellent results following this procedure. The effect in decreasing pain is rapid and constant, while the increase in vision and solution of synechiæ, while frequent, sometimes fail. He applies the negative pole over the lids, the positive at the tip of the mastoid process, and passes a current of 2 to 5 milliampères for about twenty-five minutes once or twice daily. Jackson, of Philadelphia, ⁷⁶_{Apr., '95} has repeatedly employed the galvano-cautery as a means of destroying the tissue containing diffused charcoal remaining after gunpowder injuries. He employs

a small tip at white heat and touches the points involved in rapid succession, the contact being continued each time until it is thought that sufficient tissue has been destroyed. Chloroform is to be preferred for the anæsthesia required.

Goodman and Ziegler, of Philadelphia,²¹²⁹_{v.1, No.1} state that the internal administration of oil of turpentine is unusually efficacious in the treatment of chronic iritis, iridocyclitis, iridochoroiditis, and sympathetic inflammation.

Berry, of Edinburgh,⁶_{Aug. 3, '95} has found chlorine-water the safest and least irritating of antiseptics, and especially useful in suppuration, traumatism, and sympathetic ophthalmia. He injects 4 drops of a 4-per-cent. solution with an hypodermatic syringe into the centre of the vitreous through the sclerotic, between the insertions of the external and superior recti muscles. Suker, of Toledo,¹⁰¹⁸_{July, '95} considers gallicin applicable in all cases of catarrhal affections of the mucous membrane of the eye, either with or without secondary eczema; in cases of phlyctenular keratitis or conjunctivitis, in follicular conditions, and in superficial keratitis. It is best employed in the form of powder. Guaita, of Siena,³⁰_{Dec., '94} has used formalin for lavage of the conjunctiva; also in suppurative keratitis, granular ophthalmia, and in ophthalmia neonatorum. For sterilizing the conjunctival sac prior to operation, a 1 to 2000 solution is in no way irritating. By making bouillon cultures of the conjunctival contents after the washing, formalin was determined to yield better results than boric acid, salicylic acid, sublimate 1 to 2000, sterilized water, or normal salt solution. The substance also has a slight local anæsthetic action. In granular conjunctivitis he rubs the everted lids with a 1 to 4000 solution and follows this by a lavage with 1 to 2000 solution, and proceeds in the same way in pannus after producing a jequirity inflammation.

Buller, of Montreal,²⁸²_{Dec., '94} has seen mental hallucinations, stupor, and complete loss of co-ordination of ordinary muscular movements follow the instillation of a 2 grain (0.13 gramme) to the ounce (30 grammes) solution of scopolamine into the eyes of a man 75 years of age. The face was slightly flushed, but the pulse and respiration were normal. The patient made a good recovery. Lavagna¹⁴_{June 12, '95} has found that instillation of a 1-per-cent. solution of hydrobromate of arecoline produced marked myosis in three minutes, lasting seventy minutes, and a strong ciliary contraction (5 to 6 dioptries), lasting for seven or eight minutes.

After experimental study of the diffusion of subconjunctival injections, Mellinger and Bossalino, of Basel,²⁵⁴_{June, '95} believe the fluid is carried by the large channels over the whole of the exterior

of the globe and optic nerve, entering also into the supra-choroidal spaces and under the sheath of the optic nerve. As no inflammation is produced, the lymph-corpuscles have no influence in the diffusion of the opaque pigment-matter contained in the experimental fluid. Mellinger ²⁵⁴_{Nov., '94} thinks that the beneficial influence of subconjunctival injections is due to the stimulation of the lymphatic circulation, thus hastening the removal of infectious material. The injection of bichloride solution, 1 to 2000, is very painful and results in the obliteration of the subconjunctival space by producing an adhesive inflammation. A chloride-of-sodium solution has an equally beneficial effect without any of its objection. A 2-per-cent. solution of common salt is very efficacious in hypopyon keratitis, keratitis ulcerosa, kerato-iritis, and choroiditis suppurativa. Baker, of Bay City, ¹⁰¹⁸_{Oct., '94} reports excellent results from the bichloride method in the treatment of interstitial keratitis, choroiditis, and neuroretinitis.

Subconjunctival injections of corrosive sublimate, 1 to 1000, have been found by Schmidt-Rimpler, of Göttingen, ¹¹⁶_{Mar., '95} to be of no value in hypopyon keratitis, corneal ulcer, or diffuse keratitis, but may be more useful in iritis and chorioretinitis. He has used them without beneficial effect in three cases of infected wounds of the eye. Judging from the discoloration of the iris due to the absorption of pigment from subconjunctival hæmorrhages, the corrosive sublimate is absorbed, but the quantity of mercury is too small to have any decided effect. Darier, of Paris, ²⁵⁴_{Apr., '95} believes that the conjunctival necrosis and fibrinous adhesions between the conjunctiva and the sclera, noticed by Mellinger, as well as the great pain after subconjunctival injections of solutions of mercuric chloride, are caused by making the injections too deep into Tenon's capsule or too near to the limbus corneæ. The use of the sublimate solution is greatly superior to that of sodium chloride, and exception may be taken to the statement of Gutmann that subconjunctival injections are almost useless; Gutmann should have continued the injections much longer and used general therapeutic measures in connection with them. The pain may be relieved by the use of 1 per cent. of cocaine in the injected fluid, which should contain no alcohol. Da Gama, of Bombay, ¹⁰⁹²_{Aug., '95} has found subconjunctival injections of bichloride of mercury valuable not only in syphilitic affections of the eye, but likewise in phlyctenular conjunctivitis and keratitis.

Subconjunctival injections of corrosive-sublimate solution have been employed by Bull, of New York, ¹_{Jan. 19, '95} in the treatment of various diseases of the eye, in forty-eight cases. From this experience he draws the following conclusions: 1. The pain induced

by the injections is always severe, in spite of the persistent and careful use of cocaine. 2. The reaction is apt to be severe and sometimes very severe. 3. The only classes of cases in which the sublimate injections seemed to exert any positive effect in allaying the severity of the symptoms and shortening the duration of the process were those of scleritis and acute iridochoroiditis of the non-syphilitic type. 4. The method of treatment by subconjunctival injections of sublimate solutions is still on trial and should not be promiscuously employed in all sorts of cases as part of, or in place of, the routine treatment. It must stand or fall on its merits, and these can only be ascertained by careful and long-continued observation of a large number of cases. The severe pain and the occasional violent reaction produced by the injections must always be a bar to the universal employment of this method of treatment.

In answering some objections made to subconjunctival injections, Darier, of Paris,¹⁷¹_{Dec., '94} states that he does not advocate the treatment to the exclusion of all others, but as an intensive and rapid method of mercurializing the ocular tissues, as much more of the sublimate penetrates the eye than when employed after the usual hypodermatic method. The indications for its use must be carefully studied, as it may do distinct harm, but in general it may be tried in all inflammatory conditions of the cornea and uvea, and always in conjunction with general treatment. In acute uveal inflammation great caution should be used, as the procedure may inaugurate violent and deplorable reaction. In the grave ocular manifestations of syphilis, Abadie, of Paris,¹⁷¹_{May, '95} advocates intra-venous injections of corrosive sublimate, first practiced by Baccelli, as he thinks other methods of antisiphilitic treatment are inadequate.

De Wecker, of Paris,¹⁷¹_{June, '95} thinks that subconjunctival injections of 1 or 2 drops of a 1 to 2000 solution of bichloride are useless. He has obtained excellent results by the injection of a half or whole syringeful of bichloride (1 to 2000), in suppurative corneal affections, with no other treatment beyond bandaging the eye. Sous, of Bordeaux,¹⁸⁸_{Sept. 30, '94} strongly advocates subconjunctival injections and reports cases of maculæ of the cornea, serous uveitis, and specific iritis in which he has obtained the best results from them. The substances used were bichloride of mercury, 10 minims of Van Swieten's solution, sulphate of sodium, and chloride of sodium, the latter appearing to be valuable in clearing up opacities of the vitreous.

Frenkel, of Lyons,²¹¹_{Sept. 30, '94} has successfully treated a patient who showed diphtheritic conjunctivitis, without other localization of the disease, by a 5-per-cent. solution of nitrate of silver and lemon-

juice. Four cases of diphtheritic conjunctivitis, cured by injection of antitoxic serum, have been reported by Morax, of Paris, ¹⁷¹_{Apr., '95}. In each case the Klebs-Löffler organism was isolated, and guinea-pigs inoculated with the virus died within forty-eight hours. Where the membrane is localized to the conjunctiva he advises an injection of 10 cubic centimetres ($2\frac{1}{2}$ fluidrachms) of the serum; but if it has extended to the pharynx 20 cubic centimetres (5 fluidrachms) should be given at first. Where no bacteriological examination can be made he advises the use of the serum as a safeguard, with the employment of local applications of nitrate of silver, if there be a purulent secretion. Coppez, of Brussels, ⁸⁰⁸_{Nov. 24, '94} reports a very severe case of diphtheritic conjunctivitis, complicated by a diphtheritic membrane on the cheek and external auditory canal, which responded in forty-eight hours to the anti-diphtheritic serum and healed without cicatrices. Two cases of diphtheritic conjunctivitis have been treated by Jessop, of London, ²_{Feb. 9, '95} with Klein's antitoxin. The first case was a boy, 19 months old, who had a membrane on the conjunctiva of both lids of the left eye, with a patch of membrane on the left side of the uvula. One lymph-gland over the parotid was enlarged. The urine contained albumin. Three injections, amounting to $1\frac{1}{2}$ drachms (6 cubic centimetres), were given. The membrane disappeared permanently in five days. In the other instance the palpebral conjunctiva of both eyes was involved, the parotid lymphatics were enlarged, and there was a muco-purulent discharge from the nose. The membrane disappeared in four days after two injections containing 1 drachm (4 cubic centimetres) in all. No local remedies were used. In both cases Löffler's bacillus was found in the membrane in large quantities.

Southard, of San Francisco, ⁵⁹_{Apr. 6, '95} directs attention to the fact that a magnified image of the cornea, iris, and anterior surface of the lens, permitting a careful study of these tissues, can be obtained with the ophthalmometer of Javal and Schiötz.

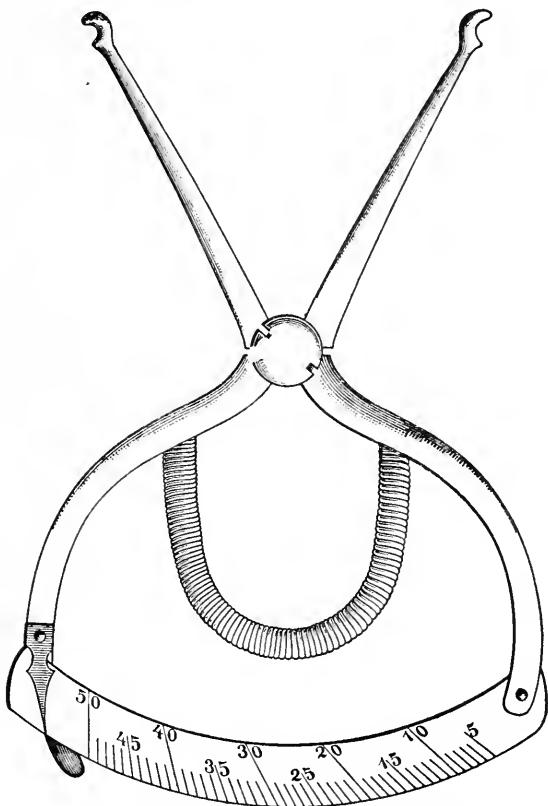
Berens, of Philadelphia, ²¹²⁹_{v. 1, No. 1} has devised some excellent blanks for sketching the fundus oculi. The colors, which represent those of the undetailed eye-ground, can be removed from any portion, either with an ordinary eraser or sharp instrument, thus depicting atrophies, etc.; and the vessels, etc., can be sketched on any part of the plate.

The accompanying illustration represents an orbital measurer devised by Wicherkiewicz, of Posen, ³⁵³_{Nov., '94} by means of which the diameter of that cavity may be quite rapidly and accurately determined.

Ostwalt, of Paris, ²⁰⁴_{B. 40, H. 5} thinks that all instruments for measuring

the degree of intra-ocular tension are useless when they depend upon producing a deep impression in the ocular envelope. Those only should be employed which merely flatten the eyeball. After repeated experiments he gives preference to the tonometer of Maklakoff and Fick, particularly to the model that has been constructed by Verdin, of Paris.

The advantages claimed for a new phorometric table-bracket,



ORBITAL MEASURER. (WICHERKIEWICZ.)

Klinische Monatsblätter für Augenheilkunde.

devised by Soulé, of Freeport, ¹_{Feb. 2, '95} are: Rigidity, better position of the lens-holders, comfort and stability of the patient secured by forehead- and chin-rests, ease of control of the chin-rest, improvement in the revolving cells, and greater accuracy in the contrivance. The advantages claimed for an improved phoroscope devised by Aitkin, of Savannah, ⁵⁹_{Oct 20, '94} are that the series of cylinders give an increased length and brilliancy to the band of light, and that the instrument presents a large square opening before the

pupil, thus avoiding the dynamic factor which is introduced by the efforts of the patient to see through the stenopaic opening in the ordinary instrument. It also saves the annoyance of accurate adjustment.

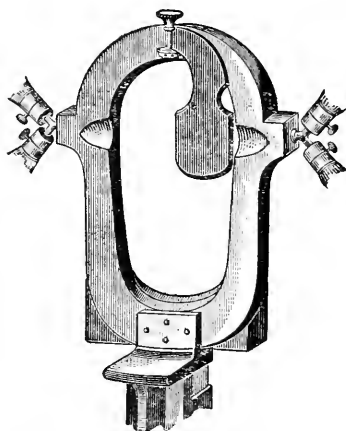


FIG. 1.—EYE-SHADE FOR OPHTHALMOMETER. (SKEEL.)

Medical Record.

The ophthalmometer of Javal has undergone a further modification in the hands of Valk, of New York, ⁵⁹Feb. 9, '95 who, in order to obviate the jerking motion resulting from the close fit of the

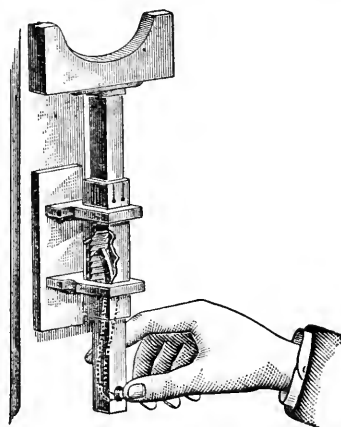


FIG. 2.—CHIN-REST OF OPHTHALMOMETER. (SKEEL.)

Medical Record.

telescope-tube within the stand required to maintain the arc in the position placed, has had a large beveled gear secured to the barrel of the telescope, and a second small one turning on a pinion attached to the barrel of the stand and turned by a milled head. A

mechanical modification of the ophthalmometer has been devised by Skeel, of New York.⁵⁹ The eye-shade, as shown in Fig. 1, is hinged to the centre of the head-rest, upon which it may be made to turn to either side. The rod which carries the chin-rest, shown in Fig. 2, is made hollow and contains the pawl, the ratchet being inside the bracket, through which the rod slides; by pressing a button which projects from the rod near its lower end, the pawl is disengaged and the rod may be raised or lowered to its proper place, where it will remain when the button is released. For adjusting the telescope the foot of the tripod-base, which carries the elevating screw (shown in Fig. 3), has a deep channel on the under side to receive a lever, the short arm of which is acted upon by the screw, while the long arm extends out under the central

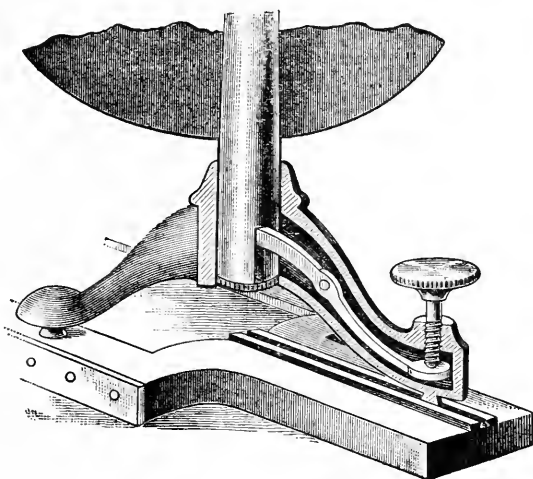


FIG. 3.—BASE OF OPHTHALMOMETER. (SKEEL.)

Medical Record.

upright pillar, which is made to pass through the base. When the screw is turned downward the pillar, with the telescope, is carried upward and *vice versa*, the pillar always remaining perpendicular. In this adaptation the focus, being once found, is not lost while bringing the image of the mires to the centre of the telescopic field.

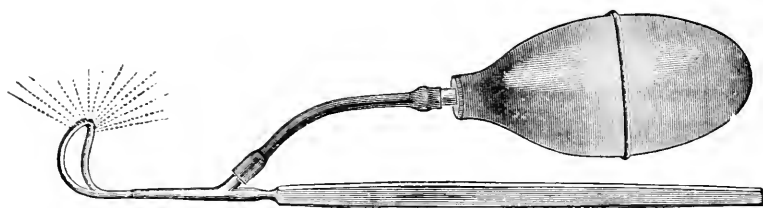
Haddæus, of Essen,³⁵³ has constructed a trial-frame by means of which all of the lens can be properly rotated and different cylindrical as well as prismatic combinations acquired at will.

Despagnet and Valois, of Paris,¹⁷³ have invented a portable apparatus for sterilizing dressings and instruments,—the former by dry heat, the latter by moist heat. The apparatus consists of a cast-iron box with double walls and two drawers. The lower

drawer is filled with water for instruments, while the upper one—which is intended for the dressings—is heated by the column of hot air contained by the two walls of the stove. The heat is obtained from an alcohol-lamp. By means of this apparatus temperatures of 150° to 160° C. (302° to 320° F.) can be readily obtained, the degree being modified by opening or closing the upper vents.

Whitney, of Tokio, in a personal communication, describes a safety eye-speculum which he has had constructed with locking blades after the manner of the obstetrical forceps. The advantages claimed are that the instrument may be quickly removed with the least pressure on the globe and the slightest separation of the lids.

The accompanying sketch shows a modified lid-elevator for irrigating the conjunctival *culs-de-sac* in the treatment of purulent conjunctivitis, introduced by Callan, of New York. ¹ May 18, '93 By the



LID-ELEVATOR FOR ELEVATING CONJUNCTIVAL SAC. (CALLAN.)

New York Medical Journal.

use of the bulb a moderate amount of the solution may be used or a constant flushing can be secured by attaching a larger receptacle to a longer tube.

A new fixation-forceps has been devised by Dujardin, of Lille. ^{171.} Dec., '95 In order that the instrument may better adapt itself to the globe, it is provided with an unusually broad concave surface. To obviate the annoyance and, at times, complication of rotation of the eyeball in making a corneal section with the ordinary fixation-forceps, Holmes ⁵⁹ Apr. 20, '95 has devised a pair of double forceps to insure a perfect fixation of the eyeball at two points that are exactly opposite cutting portions of the knife. In ordinary cataract operations they should be fixed parallel to the horizontal diameter of the cornea. Lagrange, of Bordeaux, ⁷⁰ July 28, '95 has devised an irrigator for the *culs-de-sac*, consisting essentially of a hollow, perforated retractor.

Campbell, of Detroit, ¹⁸⁵ Oct., '94 has introduced a modified Knapp roller-forceps designed by Sherman. In this instrument the rollers

project beyond the side-bars so as to permit of the insinuation of the instrument into the crevices at the canthi. The accompanying cut illustrates a pair of cilia-forceps devised by Allport, of Minneapolis.⁵⁹
July 13, '96

In the treatment of chronic conjunctival affections, Peters, of Bonn,¹¹⁶
Sept., '95 has had recourse to an instrument resembling a straight keratome with the point not too bluntly rounded. The curetting edge of the knife is perfectly straight, the opposite one being slightly convex and used in cases of irregularity of the tarsus (see cut). The instrument is held vertically to the plane of the tarsus of the cocaine eye and applied with a scraping motion to all



CILIA-FORCEPS. (ALLPORT.)

Medical Record.

parts of the conjunctiva that are affected. The operation is repeated at weekly intervals if required, ice-compresses being the after-dressing for two days. He has found this measure of great value in trachoma, spring catarrh, catarrhus siccus, and obstinate follicular conjunctivitis.

Unclassified.

The disadvantages of monocular vision are considered by Whitehead⁶
July 13, '95 to be: Loss of power to interpret the relative position of objects, contraction of the field of vision, decrease of acuteness of vision, decrease of alertness of vision, and diminution of alertness for color-vision, as well as two objections which are purely military,—viz., difficulty in firing from the left shoulder, as



INSTRUMENT FOR SCRAPING CORNEÆ. (PETERS.)

Therapeutische Monatshefte.

proposed in cases where the right eye has been lost or damaged, and liability to catarrh of the socket when an eye has been enucleated.

For the preservation of human eyes for operative practice on the phantom, Dandandogsky, of St. Petersburg,²⁵⁴
Apr., '96 has recourse to formol hydrate in a 0.1-per-cent. to 0.05-per-cent. aqueous solution. The eyes are removed from the corpse as soon as possible and placed in the above solution, which will preserve the transparency of the media for five to seven days, after which, if necessary, the eyes must be placed in a 1 to 5000 thymol solution.

The discoloration of yellow oxide-of-mercury ointment has been found by Holth, of Drammen, Norway, ²⁵⁴_{Apr., '95} to be due to the reducing influence of light penetrating the receptacles of the ointment. Temperature, exposure to air, or chemical actions have no influence upon the mercury, but the salve should be kept in an absolutely opaque receptacle or in a dark room. The best base consists of equal parts of lanolin and water with two parts of vaselin. The following salves are also decomposed by exposure to the light: Red precipitate, iodoform, beta-naphthol, pyrogallol, and resorcin.

OTOLOGY.

By CHARLES S. TURNBULL, M.D., PH.D.,

AND

ARTHUR AMES BLISS, A.M., M.D.,

PHILADELPHIA.

EXTERNAL EAR.

Auricle.

Tumors.—Regarding hæmatoma auris as a condition peculiar, as a rule, to the insane, Middlemass and Robinson³⁶_{Dec., '94} claim that there is strong evidence in favor of the contention that the proclivity of the insane to othæmatoma is due to a peculiar degeneration in the cartilage of the ear. This change is brought about by the same abnormal nutritional state which induces lesions of scalp, skull, and dura mater, to which the insane are specially prone. If this view is correct, then the seat of the hæmorrhage must be in the cartilage, though it will be apparently within the perichondrium, with which the new, fibrous tissue, which replaces the degenerated cartilage, always blends. As the perichondrium normally merges into the cartilage by insensible gradation, one cannot accurately speak of the blood as lying beneath the perichondrium. It must be outside, in it, or in the cartilage. Tischkow believes that when this degenerative change is fully established rupture of the new vessels may occur quite spontaneously. Even if a slight traumatic element is added, the risk of hæmorrhage will be greatly increased. It is very improbable that the disease is of a specific infective nature. The vital processes subsequent to the outpouring of the blood are merely those which occur after hæmorrhage into other similar situations. The formation of the cartilaginous nodules in the cicatricial tissue is easily understood if it is admitted that the whole or part of the perichondrium lies external to the blood-effusion. The almost invariable occurrence of the tumor on the anterior aspect of the cartilage has never been satisfactorily explained.

[Our opinion, based upon observation, is that hæmatoma auris as a condition peculiar to the insane, in this country, is not the rule. The tendency seems to be increasing to regard othæmatoma as due to bacterial influence.—C. S. T. and A. A. B.]

Goodall, of Carmarthen,¹⁶⁶_{Oct., '94} following out the results of his former bacteriological study of the sero-sanguinolent fluid contained within the swollen auricle in cases of othæmatoma, finds that in the five cases which he has examined, staphylococci or different varieties of the streptococcus were present. He recalls the fact that Pellizzi⁵⁹¹_{V.18, No. 324, '92} had already, in 1892, found streptococci in the extravasation in five cases, and believed the disease to have originated from infection by this micro-organism, employing, for this reason, an antiseptic form of treatment.

Among the tumors of the auricle reported during the year, a case by Bullard, of Columbus, O.,⁸¹_{Sept., '95} is of especial interest. The growths, which are illustrated by the accompanying cut, were fibrous tumors of the lobules, resulting from an inflammatory



FIBROUS TUMORS OF THE LOBULES. (BULLARD.)

Virginia Medical Monthly.

process induced by piercing the lobules for ear-rings. Both these tumors were excised. The reporter states that growths of this character are extremely rare in the white race, but are seen frequently in the negro.

[Tumors of the lobe are as infrequent in the negro as in the white race, but frequent in the mixed races, especially the mulatto. —C. S. T. and A. A. B.]

Haug¹²⁶_{July 15, '95} describes two cases of circumscribed tuberculous nodules in the inferior portion of the auricle and lobule. The origin of such infiltrations may be direct infection from a phthisical patient or from the bacilli existing in the discharge from the middle ear in a case of suppurative otitis media of tubercular origin, the auricle and lobule being soiled by such discharge. It

may also develop after the use of ear-rings infected by the special virus.

Deformities.—Rohrer,¹¹ speaking of the congenital anomalies of the auricle affecting the upper part of the anthelicis,—the crusta anthelicis,—explains the absence of some part of the anthelicis, as also the occurrence of supernumerary crura in the direction of the tubercle of Darwin, and opposite the crus helicis, by the different morphological embryonic dispositions of the different parts of the anthelix, as laid down by Schwalbe, according to their dependence upon the system of branchial calculi, and to construction of the ear-fold. A unique case, described by him, was a



ORIGINAL APPEARANCE OF THE EAR. (GROVE.)

Lancet.

fusion of the crura anthelicis with the crus helicis to a single horizontal limb.

The use of an artificial auricle, a case of some interest, is reported by Grove, of Birmingham, Eng.⁶ Feb. 2, '95. A man, 63 years of age, was admitted into the Queen's Hospital, Birmingham, in April, 1893, with an epithelioma of the left auricle. The greater part of the auricle was removed by F. Marsh. A plaster-of-Paris cast was taken of the side of the head, and an artificial ear built up in wax to match the healthy one on the right side, and afterward made of vulcanite and aluminium, tinted and enameled to harmonize with the complexion. No artificial contrivance (such

as a spectacle-frame) was made use of to support the artificial auricle, adhesion to the head being effected by means of a saturated solution of mastic in absolute alcohol. (See illustrations.)

A new and what the writer considers a simple, plastic operation for correcting the deformity caused by too prominent auricles is mentioned by Haug, of Munich.⁶⁹ No. 40, '94 An incision is made along the posterior insertion-line of the auricle through the entire length of this line. A second incision is then made over the mastoid process, bow-shaped, and the ends united with the ends of the first incision. (Fig. 1.) The skin included between these incisions is then removed, the auricle pressed back, and the margins of the



AN ARTIFICIAL AURICLE. (GROVE.)

Lancet.

incisions united by strong sutures. Where the deformity is extremely marked the line of the first incision is lengthened (see Fig. 2) over the auricle itself, and this part of the incision carried deeply into the cartilage through half its thickness. The auricle is then grasped between the thumb and first finger and firm pressure made until the cartilage is fractured at the line of the incision, care being taken that the skin over the anterior face of the auricle, on the opposite side from the incision, is not bruised. In certain cases Haug has found it of advantage to make a third V-shaped incision in the cartilage, over the posterior face of the auricle, half-way between the two cartilage incisions already described. (See Fig. 2, C1 + C2.) The skin in the triangular

space marked *A* is removed, the cartilage itself fractured at *A*, as at the other two points described, and the anterior incision united to the incision over the mastoid by strong sutures. The auricle is held against the side of the head by a firm bandage and the stitches are not removed before the eighth day.

Fig. 3 shows the stitches in position. Haug states that he has obtained good results, in cases where the degree of deformity was not very decided, by making two small, myrtle-leaf-shaped surfaces, from which the skin is removed,—one over the mastoid process, the other in a carefully-selected corresponding position

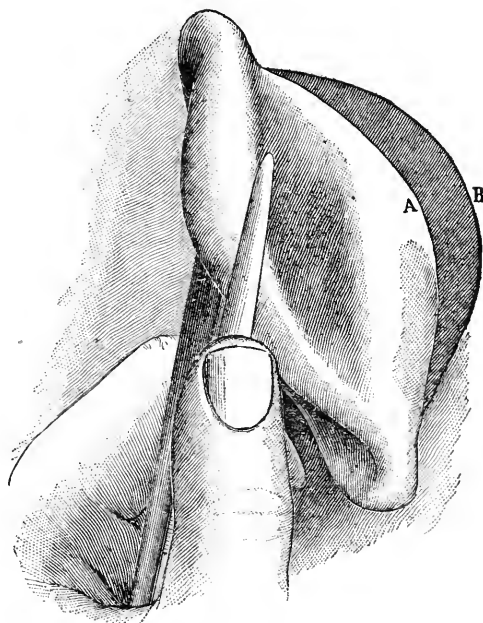


FIG. 1.—OPERATION FOR PROMINENT AURICLES. (HAUG.)

Incision *A* along the insertion-line of the auricle is united with incision *B* on the mastoid. A sickle-shaped space is thus formed, from which the skin is to be removed.

Deutsche med. Wochenschrift.

over the posterior face of the auricle. The denuded surfaces are brought together and the parts maintained in position by a carefully-placed compress and bandage.

External Auditory Canal.

Exostosis.—Hovell, of London, ²_{Oct. 20, '96} reports a case in which he removed an exostosis from the auditory canal by means of a chisel, after having exposed the growth thoroughly by detaching and drawing forward the auricle. The bony mass is illustrated on page C-8. The patient was a boy 16 years of age. The base

of the exostosis was attached to the posterior wall of the meatus, and this base presented externally, the longer limb of the mass being free and projecting into the tympanic cavity. The membrana tympani had been destroyed.

Taylor, of Norwich, Eng.,¹¹_{Nos. 8-10, '94} alludes to the same method of exposing an exostosis, and states that he has employed this method successfully in a recent case.

Ostmann, of Königsberg,³⁸⁵_{Nos. 8-10, '94} has made a study of exostoses of the external auditory canal from an ethnological stand-point, and finds that the form depends upon the shape of the skull. As

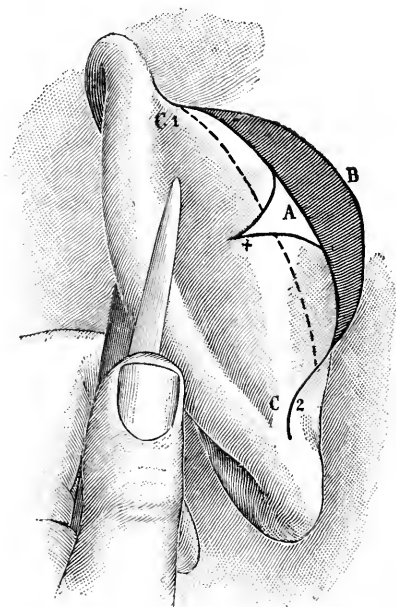


FIG. 2.—OPERATION FOR PROMINENT AURICLES. (HAUG.)

Incision A, on the posterior face of the auricle, is lengthened to C1 and C2, and the flap C2 A C1 is formed, whose base is indicated by the dotted line C1 + C2. The incision into the cartilage is made while the flap is pressed back and strongly bent.

Deutsche med. Wochenschrift.

a rule, among the dolichocephalic races the meatus is round, while among the brachycephalic it is more apt to be of oval form.

Exostoses are most frequent among the ancient Peruvians, and this fact may be accounted for by the artificial compression of the head among this people, causing it to be brachycephalic or even hyperbrachycephalic, and also by a tendency to excessive osseous development, as evidenced by the frequency of skulls with multiple exostoses. Exostoses of the external auditory canal are decidedly more common among the American and, though in less degree, among the Oceanic races, than among the African, Asiatic,

or European races. Ostmann's examinations were made upon the skulls of 1034 Europeans, of 773 Africans, of 491 Asiatics, of 202 Americans, of 113 Oceanicans and Australians; in all, 2633 skulls. Among these, exostoses of the external auditory canal were found in 16 skulls; among the Americans, 13 cases, or 6.4 per cent. of the total number of skulls examined; among the Oceanic skulls, 2 cases,—equal to 1.77 per cent.; among the Africans, 1 case. Among the 13 cases in American skulls, 12 were found in the skulls of ancient Peruvians and 1 in that of a

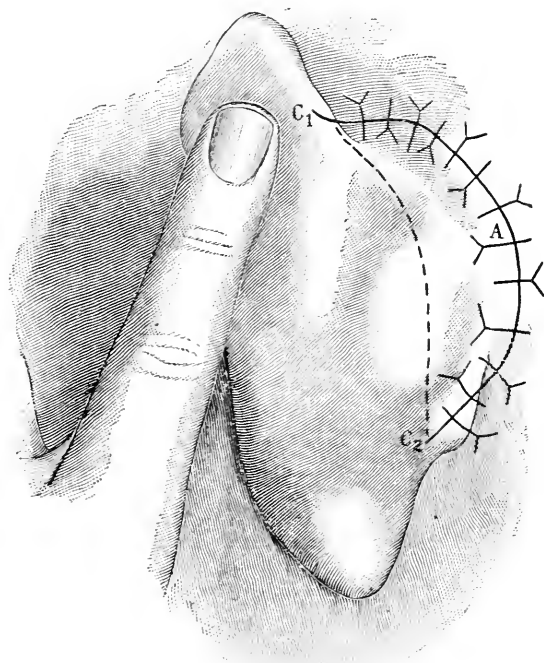


FIG. 3.—OPERATION FOR PROMINENT AURICLES. (HAUG.)

The flap C1 A C2 is attached by strong sutures to the incision-line B.

Deutsche med. Wochenschrift.

Mexican. This gives a proportion, among the 111 Peruvian heads examined, of 10.8 per cent.; among the 22 Mexican heads, of 7.4 per cent.

Eczema.—Hamet, of Paris, ²⁴_{Jan. 27, '95} in the treatment of this affection uses solution of nitrate of silver 1 to 10. Having previously cleansed the auditory canal, he soaks a fine pledget of cotton in the solution and places it in the canal, allowing it to remain there untouched for twenty-four hours, in cases of simple eczema. Upon removal the epidermis of the auditory canal has become quite

black in color and the superficial layers can readily be removed during the course of two or three days, coming away in scales. In cases of furunculosis this application of the silver solution must be repeated within two or more days. In commenting upon this treatment Burnett, of Philadelphia, ⁵_{Sept., '95} remarks that he has found strong solutions of nitrate of silver to be valueless in the treatment of the conditions described by Hamet, and that nothing equals in efficiency black wash, *ad libitum*, applied by instillation. It is especially useful in the burning, painful stage of acute eczema of the canals.

Diffuse Inflammation.—As a cause for diffuse inflammation of the external auditory canal Herzog, of Cincinnati, ⁶⁶_{Jan. 9, '95} names the variety of mold called *Verticillium Graphii*. In the case reported by him Bezold's treatment was used with good results. This consists in the instillation into the affected auditory canal of a 4-per-cent. solution of salicylic acid in alcohol. After a few weeks



EXOSTOSIS OF CANAL. (HOVELL.)

Fac-simile drawing, seven-eighths inch long, weight fourteen grains. Apex growing into tympanic cavity. Base presenting externally.

British Medical Journal.

of persistent treatment the mold was destroyed and the inflammation disappeared.

Mayet, of Lyons, ³⁷_{May, '95} calls attention to the fact that a discharge is sometimes observed within the external auditory meatus which does not come from the middle ear, but from acute retrolaryngeal (retropharyngeal?) abscess. In searching for the cause of this phenomenon Mayet examined the external canal in eighteen skulls, and concludes that until the third year of life, sometimes until later, there exists an orifice in the inferior wall of the external auditory meatus, always in front of the tympanum. In adults this orifice exists on the anterior wall,—retroglossary segment of the glenoid. The author finds that this orifice always exists in early childhood, and through it a collection of purulent matter may escape without the existence of an otitis media.

Stenosis.—Corradi, of Verona, ³⁷_{Apr., '95} recommends operative interference in cases of stenosis of the external canal in its cartilaginous portion marked by considerable hypertrophy of the soft tissues. If the stenosed part is not too extensive it can be over-

come by a simple circular incision; if, on the contrary, it involve a large area, and especially the external portion, the auricle and auditory canal must be detached, so as to permit excision of the deeper parts.

Membrana Tympani.

Injuries and Abnormalities.—Thomas, of Cardiff, Wales, ²_{Nov. 3, '94} in a study of five cases of rupture of the drum-head resulting from fractures of the skull, states that the membrana tympani is often injured in cases of fracture of the skull involving the petrous portion of the temporal bone by blows on the chin and by “a box on the ear,” the violence in each case being of the indirect nature. The accident may or may not be accompanied by hæmorrhage from the auditory meatus. The author has had the opportunity of examining five cases of fractured skull, before and after death, in

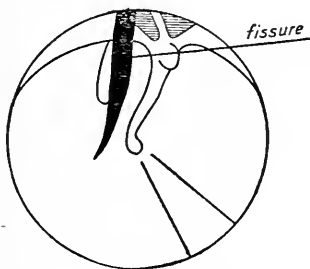


Fig. 1.

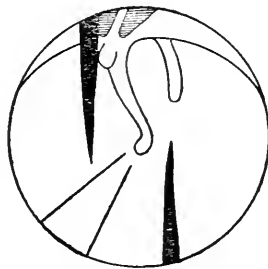


Fig. 2.

RUPTURE OF THE DRUM-HEAD AFTER HEAD INJURIES. (THOMAS.)

Fig. 1 shows fissure in the right membrana tympani. Fig. 2, the left tympanic membrane, showing two vertical slits. They are triangular, with the base at the periphery of the membrane.

British Medical Journal.

which the tympanic membrane was involved. The appearance of the membrane was the same in every case,—namely, a fissure extending from the periphery more or less toward the *umbo*. He has not met with a fissure extending right across the membrane. The direction of the rent in these cases was more or less vertical. In one, in which the roof and floor of the bony meatus auditorius were fissured, there were two separate fissures in the membrane,—one in the upper and the other in the lower portion. (See Fig. 2.)

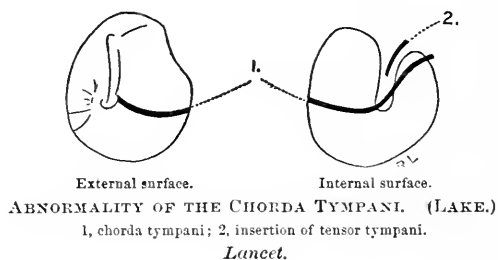
The periphery of the fissure in the membrane was always close to the fissure in the bone; hence, he thinks that the fissure indicates the direction from which the fracture extended into the ear. His impression is that the fissure in the membrane is caused by the gaping of the fissures of the bone at the time of injury, there being evidence that gaping takes place in recorded cases where dura mater or hairs have been found nipped in the fissure.

The accompanying diagrams, Figs. 1 and 2, illustrate the

peculiarity of the rents in the drum-head which were observed in the cases seen by Thomas.

Lake, of London, ⁶Jan. 5, '95 states that for the chorda tympani to take an irregular course in its passage across the membrana tympani must be exceedingly rare; but he has seen a case in which the chorda made its exit at the usual level, but, instead of arching upward, it ran almost horizontally forward to about the junction of the lowest fourth of the handle of the malleus with the remainder; it was clearly visible through the membrane from the meatus. On the inner side, after reaching the malleus, it ran upward, passing off to leave the tympanum by the canal of Huguier, keeping below the tendon of the tensor tympani. The abnormality is illustrated by the accompanying cuts.

Schleicher ³³⁶Aug. 31, '95 has devised a means for regulating the current so that, in using a galvano-cautery snare, the heat can be maintained at a fixed degree. As a rule, the heat becomes more intense as the noose of the wire is drawn tighter and smaller.



Schleicher has placed a small rheostat upon the handle of Schech's handle, which controls the current as the loop is narrowed.

As an artificial ear-drum, Blake's discs have been employed with success by Marple, of New York, ¹June, '95 who resorted to this device in three intractable cases of abnormality of tension in the sound-conducting apparatus. The usual symptoms caused by this condition were manifested,—vertigo (made worse when the head was held in certain positions), diminution of aerial conduction, and buzzing tinnitus. All such symptoms were relieved while the discs were maintained in place. These discs are made of soft rubber of the variety used by dentists for rubber dams; they can also be made of thin paper. In applying them the two ends are seized with the angular ear-forceps, the convex-bent middle is smeared with a little vaselin, and it is then inserted through the speculum until it is in contact with the short process of the malleus. The rubber is then released, one end falling

against the anterior, the other end against the posterior, wall of the meatus. It is now carefully examined to see whether it is in accurate contact with the short process. To be sure of this, it is well to push it back lightly with a cotton-tipped applicator. The soft rubber produces no irritation, and the patient is not conscious of the presence of anything unusual in the ear.

A fine piece of silk thread drawn through the disc, the free end of the thread lying in the auditory canal, enables the aurist to remove the artificial drum-head readily.

The paper disc can be inserted by smearing the end of a cotton-tipped applicator with a little vaselin, pressing it on the disc, which thus adheres to the applicator and can be pushed into position. When it is in contact with the membrana tympani it remains adherent there on withdrawing the applicator. When it is desired to remove the disc it can be syringed out with warm water, or a short piece of fine-silk thread can be attached to the middle of the disc by a bit of wax, and traction made.

Writing upon the subject of artificial drum-heads, Gomperz, of Vienna, ²¹_{Nov. 3, '94}, states that these mechanical devices are to be relied upon when certain conditions of the sound-conducting apparatus are manifest: (1) where only a small area at the periphery of the drum-head is destroyed, the handle of the malleus being, in whole or part, intact and adherent to the promontory; (2) where the perforation involves the postero-superior quadrant of the drum-head or the entire posterior half; (3) where the fenestra ovalis is free; (4) where the mucosa is changed to a dermoid membrane and where the long process of the incus is absent. Where the ossicular chain is complete, the artificial drum-head is of service in a minority of cases only. In instances in which it has been decidedly useful the author has always noted a free space between the postero-superior border of the perforation and the oval window, so that a deep recess existed back of the handle of the malleus. The best form of artificial drum-head is produced by a small deposit of powdered boric acid, as recommended by Rosen-garten. After an otorrhœa has ceased, this powder, well blown in, will remain in place for weeks or even months. He finds that such a small mass of powder is not irritating, and will serve to increase the hearing-power better than any of the usual standard forms of artificial drum-head.

- New Instruments for External Ear.

Williams, of St. Paul, ⁵⁹_{Aug. 10, '95}, has made use of a new myringo-tome the special features of which are the size of its handle, giving the operator a firm hold upon the knife, and an angle in its

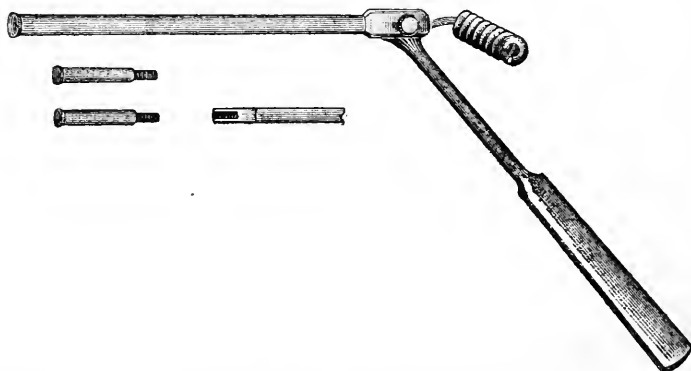
shank which lifts the blade above the level of the operator's hand, thus preventing his hand from cutting off the view of the field of operation. (See cut.)

Eldridge, of Yokohama, Japan, ⁹⁹_{Nov. 1, '94} has produced a new instrument for removing foreign bodies from the ear. The long shank of the instrument ends in a cement-lined cup, which is applied to the foreign body within the meatus,—a small stone, for



NEW MYRINGOTOME. (WILLIAMS.)
Medical Record.

instance. The metal coil at the proximal end of the instrument is then heated by means of a small lamp. This heats the wire, of which the coil is a part and which terminates in the metal cup, whose cement becomes melted and thus fuses the instrument to the foreign body. When sufficiently tight the instrument is withdrawn, bringing with it the offending body. (See cut.)



NEW INSTRUMENT FOR EXTRACTING FOREIGN BODIES FROM THE EAR. (ELDRIDGE.)
Boston Medical and Surgical Journal.

MIDDLE EAR.

Non-suppurative Otitis Media.

The prognosis of chronic non-suppurative otitis media with imperforate membrane was made a subject for discussion in August, 1894, in the section on Laryngology and Otology of the British Medical Association. ²_{Nov., '94} The importance of the remarks made at this meeting lies not so much in the views expressed by different otologists present as in the high standing and acknowl-

edged skill of the members who took part in the conference,—Field, Barr, Grant, Browne, Love, Downie, Permewan, Hill, Johnston, Knapp, Pegler, and Milligan. The statements made by Field in regard to prognosis in this form of otitis media were agreed to generally by all the other speakers, and can be fairly taken as voicing the opinion of English otologists at the present time. Field summed up his remarks as follows: 1. Prognosis in chronic middle-ear catarrh is most favorable in children and young adults, in whom the cause is plainly attributable to local and removable obstruction, naso-pharyngeal or faucial abnormalities, or to simple mucous obstruction of the Eustachian tube from a common cold or other temporary catarrhal condition the result of inflation and other tests, satisfying us that secondary changes have not yet occurred to impede the functions of the membrane and ossicles. 2. When, from whatever cause arising, or however long or short the duration, or from the age of the patient and other circumstances, the hearing-power after inflation is recovered in part only, the inference is that consecutive changes due to organization of secretions have already commenced, and that slowly or quickly, depending upon a number of conditions already detailed, the disease will continue to develop, no matter what treatment be adopted (Sexton, Roosa). Roosa thinks that about 20 per cent. of adult patients are relieved, but none absolutely cured. 3. The prognosis is unfavorable where, with much deafness, there is no improvement whatever after forcible catheterization, dilatation of the Eustachian tube, removal of secretions, or the intra-tympanic injection of solvents. 4. The prognosis is absolutely bad (still as regards improvement) when the symptoms point to primary sclerosis, and worst of all (as regards in this case retention of any hearing-power) where, with or without sclerosis, the tuning-fork tests point to serious labyrinthine disturbance.

Treatment.—Excision of the ossicles as a form of treatment in sclerosing otitis media has continued to receive some notice in the journals, although interest in this subject is evidently waning. Jack, of Boston, ⁹⁹_{Jan. 10, '96} draws the following conclusions from his personal experience in sixty cases of stapedectomy during the past two years: 1. That the best results in hearing have been obtained in cases of early removal of the bone, and that this operation is of little use in cases of otitis media insidiosa (sclerosis). 2. That cases of chronic aural vertigo have been permanently relieved by liberation of the stapes or by extraction of the bone itself. 3. That in cases of non-suppurative disease of the middle ear, as well as those resulting from a chronic suppurative process, surgical mobilization should first be tried before an attempt is made to remove

the stapes. 4. That most operations for mobilizing the stapes or freeing the oval window must be looked upon as largely experimental, and that in many cases a fracture of the crura occurs at the time of attempted extraction, leaving the base-plate.

Lawrence Turnbull, of Philadelphia, ¹⁹_{Apr. 13, '96} in a paper on "Removal of the Diseased Ossicles in Non-suppurative or Chronic Middle-Ear Inflammation," states that in carefully-selected cases he has obtained good results from excision (otosclerectomy).

Urbantschitsch, of Vienna, ³⁷_{Aug., '96} at the meeting of the Austrian Society of Otologists, May 28, 1895, reported a case in which the extraction of the malleus from an ear affected with suppurative inflammation appeared to improve the functional activity of the other ear, which had lost the power of hearing to a very considerable degree. There was no increase of hearing in the ear operated upon (the left), although the otorrhœa was lessened. In the other ear (the right one), however, increase of hearing was noted on the day following operation, and the gain at the time of report had been maintained for a long period. In another case reported by Urbantschitsch the removal of the malleus had not caused an increase in hearing, but had resulted in the complete cessation of the violent attacks of vertigo from which this patient had suffered.

Beco, of Liège, ¹¹_{Dec., '94} has found the malleus-extractor of Delstanche to be a most useful instrument. It consists of a ring which is fitted carefully about the handle of the malleus, high up, and, by a "see-sawing" movement, the operator is enabled to loosen and remove the ossicle very readily. The author thus sums up the advantages offered by the use of this instrument: The application is easy, and section of the tensor tympani is executed without difficulty and is very perceptible at the moment when that takes place. It is only necessary to make several antero-posterior sawing movements, which serve, in addition, to isolate the ossicles. The see-saw movement which is given to the malleus is effected without resistance and with great certainty, without risk of fracture. The ossicle is drawn out by the annular extractor itself, if one be careful to keep the instrument close against the superior wall of the meatus. If it drop out *en route* it can be removed by means of an ordinary forceps. While the operation is accomplished easily, safely, and rapidly, it causes no unnecessary ulceration, and is not followed by any troublesome consequence attributable to it, nor by any complication. The procedure must be done rapidly under thorough illumination and local anæsthesia. Once the ossicle is engaged in the ring the rest of the operation can be performed in the dark. It is sufficient to have the head of the patient firmly fixed in order to terminate the operation in a few seconds.

[Excision of the ossicles, as a means for restoring hearing which has been lost by the changes following sclerosis of the sound-conducting apparatus, may be said to have had its day, and the hopes of improvement once encouraged by this apparently rational procedure have ended in disappointment. Indeed, it would hardly be reasonable to continue to include the method among the various practical forms of treatment for sclerosis, if we accept the statements and demonstrations of Politzer, made in a paper on a primary affection of the labyrinthine capsule, presented at the last International Congress. These views are quoted in our article in the ANNUAL of last year, and have later been published in full, with many illustrations of the author's pathological preparations.⁶⁶
Oct., '94 As a result of increased experience among aural surgeons with the various forms of excision a striking decrease is to be noted in the number of articles and the reports of cases bearing upon this subject in the otological literature of the year.—C. S. T. and A. A. B.]

Among the various forms of treatment of a less operative character recommended for sclerosis of the middle ear is the use of electricity in the form of the induced or continuous currents. Munier, of Paris,¹⁵²
Aug., 30, '95 states that the only point upon which there is any general agreement is the belief that the continuous current, or galvanic, is more active in relieving tinnitus than is the induced, or faradic, current. For deafness or for simply a reduction in hearing the author prefers the faradic current, because the weakness in hearing is connected with the weakness of the muscles of the middle ear and in most cases the patient has greater tolerance for the faradic current, while the greater simplicity in application and technique renders it preferable. Slaes-Brame, of Lille,⁷²⁰
July, '95 prefers the interrupted current, and believes that the continuous current should not be employed, as its influence upon the ear is injurious.

Bonner, of Bradford, Eng.,²
Oct., '94 derives benefit from the use of intra-tympanic injections in the treatment of chronic "dry catarrh" of the middle ear. After considerable experience with this form of treatment, he now employs only a 3-per-cent. solution of bicarbonate of soda in equal parts of glycerin and water or paroline. The solution must be sterilized and applied while warm, a large Pravaz syringe being used to inject the solution either directly through the Eustachian tubes, per catheter, 2 or 3 fluidrachms (8 or 12 grammes), or through Weber-Ziel's intra-tympanic catheter, 20 or 30 minims (1.3 or 2 grammes). After making the injection air is to be blown through the catheter.

[Vibratory massage, though an old subject, is being brought

forward with a zeal amounting almost to enthusiasm. As compared with the armamentarium at present utilized by its advocates, the old suction-pump in the form of Siegle's pneumatic speculum or the instrument devised by Delstanche are simply child's play. The object of the various forms of apparatus recommended is that of producing vibrations in varying degrees of rapidity and in intensity of tone. The basis for the vibrometer, which may be taken to represent the apparatus, is a banjo- or guitar- like instrument the strings of which are set in motion by mechanical means, electrical motors being the most popular. The rattling sounds thus produced are conveyed to the ears of the patient by tubes with ear-pieces. The effect of this jarring sound—the intensity and pitch of which can be controlled by the operator—is, it is claimed, to throw the sound-conducting apparatus into vibration, thus loosening adhesions. This treatment must, of course, be repeated in varying degrees of frequency, but, its advocates state, will in very many instances effect an increase in the hearing-power and will relieve tinnitus aurium and aural vertigo. Some critics, however, do not hesitate to characterize this class of instrument by the title "fake." We can only let its advocates speak for themselves. —C. S. T. and A. A. B.]

Würdemann, of Milwaukee, ⁶¹_{Oct. 13, '94} has obtained favorable results in a great number of cases of chronic non-suppurative catarrh of the middle ear by the use of intra-tympanic massage, with vapors. In mild cases he has restored hearing, and when sclerosis has been more advanced he has apparently arrested the process, the subjective sounds being mitigated and slight improvement in hearing obtained in the majority of instances.

A compressed-air apparatus provided with a regulating valve is necessary, according to the author, as accurate dosage of the air-pressure is required. The air passes through the medicating apparatus (vaporizer) and is conducted to the mouth of the catheter by an ordinary pure-rubber tube five millimetres in diameter. The air-valve is turned on at the required pressure and the tubing at the catheter compressed about every second by the thumb and forefinger, producing an interrupted current, which gently and thoroughly massages or vibrates the lining of the Eustachian tube, the drum-head, and the ossicles, loosening the joints, breaking up adhesions, and increasing the nutrition of the lining membrane at the same time that the medicated vapor is brought thoroughly in contact with all parts of the tube and tympanum. At first this process is repeated daily for five to ten minutes at each sitting for either ear, and afterward every other day until no further improvement in the hearing or subjective

symptoms results, occasional after-sittings being indicated and in many instances the patient being taught the use of the Politzer bag. The course of treatment involves a dozen to a score or more of sittings.

Würdemann gives the following list of the solutions for vaporization, which he has found most useful:—

1. For simple aural catarrh or Eustachian salpingitis:—

R Benzoinol, 100.00.

Or,

R Thymol, 0.50.
Eucalyptol, 1.00.
Benzoinol, 100.00.

2. Where attended by much tinnitus aurium the above or,

R Camphor, 2.50.
Menthol, 2.50.

M. Triturate until clear oil forms; add benzoinol ad q. s. 100.00.

3. In sclerosis:—

R Cryst. iodine, 1.00.
Potassium iod., 3.00.
Glycerin, 30.00.
Camphor-water, ad q. s. 100.00.

M. Camphor, 4.00.

Lautenbach, of Philadelphia,¹⁹_{Oct. 20, '94} states that ossicular exercise, which he terms "ossicular massage," has for its object the regular movement of each ossicle one upon the other, with the consequent changes brought about in the nutrition of their joints, from the friction and the increased circulation. It aims to increase the length of the shortened ossicular arch and also to draw out into a normal position a retracted or adherent membrane, while at the same time it endeavors to loosen a jammed stirrup or one more or less adherent to the oval window. In addition to this, pneumo-massage slightly influences the round window and the internal-ear fluids within, and likewise exerts some effect on the upper end of the Eustachian tube, as well as the entire mucous lining of the middle-ear cavity.

"This method is not one of destruction, but of construction; it removes nothing; it allows the parts to remain intact, while it gives to them normal exercise of the muscles, ligaments, and articulating surfaces, and an increased and healthier circulation, with correspondingly increased and healthier secretions." The practical deductions which he has reached, as the result of his use of ear-massage, are: 1. The method is not difficult to apply, and can be used by any one who has a proper conception of the structure and functions of the ear, with a knowledge of the pathological

conditions present. 2. There is no risk. It has never occasioned harm nor made the symptoms worse, nor does it in any way interfere with other treatment. 3. Should it fail in accomplishing the desired result, it does not prevent the use of further measures. 4. It has improved the hearing in over 90 per cent. of his cases. 5. In about 90 per cent. tinnitus has been relieved. 6. It has, perhaps, in a little over the half, removed the vertiginous symptoms.

Jackson, of Pittsburgh, ⁶¹_{May 11, '95} has devised an aural masseur from the use of which he is able to report good results. The instrument consists essentially of a cylinder oscillating on a central pivot and within this cylinder a piston moved up and down by a revolving crank-disc. Motion is imparted to the masseur by a small electrical motor run by a battery, storage-cell, lighting-circuit, or other source of electricity. It may also be operated by a crank arrangement. A rubber tube leads from the bottom of the cylinder and ends in an ear-piece to be inserted in the external auditory meatus of the patient. When the instrument is set in motion the moving up and down of the piston within the cylinder causes a to-and-fro motion of the column of air confined in the tube and meatus, resulting in a to-and-fro motion of the membrana tympani and ossicula. A very mild action has given the best results.

Clark, of San Francisco, ⁷⁷_{July, '95} having employed the vibratory method of massage for the treatment of deafness in sclerosing otitis media, is inclined to regard this form of procedure with favor. His instrument consists of a guitar firmly attached to a stand, with a movable electrical vibrator adjusted to strike any desired string. The range of vibrations is from 80 to 320 per second, and can be increased to 1000 per second by the use of frets. The strings found to be the most effective were those vibrating from 80 to 160 times per second. As a rule, the greater the volume of sound produced, the better were the results.

After six or more months of faithful experimenting, Lawrence Turnbull, of Philadelphia, ¹⁹_{Mar. 9, '95} reports negative results generally, and a typical case of sclerosis of the middle ear was in no way benefited, although the vibrometer was employed for a term of six weeks.

Lester, of Brooklyn, ¹_{June 8, '95} has devised an electro-pressure sound for the direct vibration of the membrana tympani. The results claimed by certain aurists to have followed the use of vibratory massage in the treatment of sclerosis of the middle ear has led the writer to invent an instrument of precision which, he believes, has proved more than satisfactory in those cases of impaired hearing and tinnitus which are directly traceable to some defect in the conducting apparatus.

The end of the sound enlarges toward its distal extremity and in shape resembles a truncated cone. It is hollowed out not only to better adapt itself to the short process of the malleus, but also to receive a pledget of absorbent cotton or other soft material in order to prevent any possibility of mechanical injury. Sounds with spirals of different strengths have been found necessary, and in every case it has been found wiser to begin with the one of least resistance, and to continue its use until the patient's confidence has been secured and a certain degree of tolerance obtained. The motor is adapted to a two-volt current. Any good storage-cell will suffice.

[This method of treatment differs from the use of loudly-vibrating instruments, yet its object is to induce vibratory massage; so it is mentioned among the instruments of the vibrometer type.—C. S. T. and A. A. B.]

A new masseur for the drum-head and ossicular chain has been devised by Delstauche,⁸²⁸ July 20, '96 whose older instrument for this same purpose is well known.

Willetts, of Pittsburgh,¹⁶¹ July, '93 referring to the possibility that in chronic otitis media sclerotica there is a disorganization of the stapedius muscle, suggests that the vibrometer, for cases attended by this muscular degeneration, is of no value and may be injurious to parts of the ear which are still unaffected. The author regards "ossiculectomy" with some favor, thinking that the disappointing results at present are probably due to delayed operation, as the removal of all of the ossicles, including the stapes, cannot be as beneficial after changes have taken place in the membrana obturatoria, which is thickened and adherent, relatively retaining its old position and keeping up the intra-labyrinthal pressure.

Burnett, of Philadelphia,⁹ Aug. 10, '94 expresses his views far from favorable in regard to "so-called oto-massage." Urbantschitsch's method of systematic acoustic exercise he classifies among these procedures, and states that the temporary improvement in hearing is soon lost again in all cases. In regard to the more mechanical methods of oto-massage, he states that all forms of massage have absolutely no scientific otological standing, and were pronounced useless, and even harmful, in a discussion on the subject at the meeting of the American Otological Society, in May, 1894.

All forms of direct pressure on the membrana tympani must manifestly bruise and wound this structure, while the direct conduction of sound from vibrating instruments, etc., into the external auditory canal fatigues the ear very easily, as some of its promoters admit, and must necessarily have the same kind of effect upon any ear weakened by chronic catarrh as the noise of

the telephone has, or as that of pounding rivets into place has on the catarrhal ear of boiler-makers. It is plain, therefore, that all procedures of the second class must do harm to the patients.

Suppurative Otitis Media.

If the views expressed by Bing, of Vienna, ¹⁶⁹_{Dec., '94} as a result of his experiments, are correct, the use of intra-tympanic injections through the Eustachian tubes, as advocated by Bonner for sclerosis or as employed by many aurists in cases of suppurative otitis media, is a very unreliable method. Bing's experiments were conducted upon temporal bones so prepared as to correspond very nearly with the conditions existing in the living subject, and his work demonstrated that it is practically useless to inject fluids through the Eustachian tubes for the purpose of removing secretion from the middle ear if the drum-head is perforated by a large opening in its lower half. In such cases the injected fluid, losing much of its force at the isthmus of the tube, simply fills the middle-ear cavity to the level of the inferior margin of the perforation. It then oozes over into the external auditory canal, failing to reach the higher parts of the tympanic cavity. When the perforation in the drum-head is small or situated in the upper part of the membrane, the injected fluid does not escape so quickly, and therefore reaches the various portions of the middle-ear cavity more thoroughly; yet here there is danger that masses of retained secretion may be floated or forced into the mastoid antrum, there to become foci of infection.

Bing describes a far from uncommon condition found in suppurative otitis media, viz.,—small, pouting perforations, while the tympanic cavity is blocked with swollen mucous membrane. Through the small opening a more or less profuse discharge oozes and fills the fundus of the auditory canal. This condition he treats by applying a saturated solution of sesquichloride of iron to the margins of the perforation by means of a small tuft of cotton on a holder. This is carried through the perforation well into the middle-ear cavity. As a result, the margins of the perforation retract, the size of the opening is increased, and good drainage follows, hastening the final healing. Bing finds that attempts to enlarge these small perforations by incisions are useless, as the margins of the wound close promptly. By the method described he has obtained good results in several cases.

Gradenigo and Pes, of Turin, ³⁷_{May, '95} in an article upon the rational treatment of acute otitis media suppurativa, urge the avoidance of all antiseptic washes, these failing to destroy micro-organisms such as Fränkel's diplococcus, the staphylococcus pyo-

genes (albus and aureus), and the bacillus pyocyaneus. They fail also to thoroughly disinfect the tympanic cavity and are, in themselves, irritating. The necessary elements of treatment are (*a*) to give prompt escape for pus and to secure the discharge by good drainage, (*b*) to remove all secondary causes for infection coming from the external auditory canal and from the Eustachian tubes, and (*c*) to remove all mechanical or chemical sources of irritation. Gradenigo performs paracentesis of the drum-head, secures good drainage by the introduction into the canal of fine strips of iodoform gauze, and to avoid causing occlusion of the canal does not use insufflations of powder or douches, and avoids, as much as possible, catheterization of the Eustachian tubes,—ordinary Politzerization or injections through the Eustachian tubes. He believes that affections of the naso-pharynx which complicate the otitis must be given thorough attention.

Otitis media is not infrequently a complication of pneumonia. Ball, of Lock Haven, Pa., ⁹_{Sept. 21, '95} reports three cases of this kind in children exhibiting most of the symptoms of meningitis, though in reality there was no meningeal inflammation. These symptoms appeared immediately upon the relief of pressure by liberation of the pus retained within the middle-ear cavity. There is danger in such cases that the true source of the irritation may be overlooked or may be referred to conditions which do not exist. As an aid to diagnosis, the writer states that in this complication the pupils are not *unequally* dilated or contracted. Deafness is likely to precede the coma.

[Paracentesis should be performed early enough to liberate serum and prevent pus formation.—C. S. T. and A. A. B.]

Bacteriology.—Among the reports of bacteriological investigations upon suppurative otitis media is a valuable paper by Gradenigo and Pes, of Turin. ³⁷_{Nov., '94} The authors, after stating that true median otitis caused by the bacillus pyocyaneus are rare and that but few cases are recorded, relate two examples in which they obtained from the pus pure cultivations of a micro-organism which they identified as the bacillus pyocyaneus. From the study of these cases they conclude that the bacillus pyocyaneus must be considered as capable of producing general infection of the organism, and that among local infections must be recorded acute median otitis. They believe that the bacillus pyocyaneus can produce solely morbid local phenomena.

Braxall, of London, Eng., ⁵_{Sept., '95} has made some bacteriological investigations of the discharges from the ear in suppurative otitis media complicating scarlet fever, and his conclusions, which do not differ from those of other investigators in this same field, are

as follow: 1. The organism most potent in the etiology of the otitis media of scarlatina is the streptococcus pyogenes. 2. The less chance there is of contamination from the outer air through the external ear, the more the pyogenic cocci predominate over the rod forms; but, prior to perforation of the membrana tympani, the occurrence of such organism is not precluded, since they may ascend from the mouth and air-passages. 3. Next to the streptococcus, the most important organisms are the staphylococci albus and aureus. 4. Apparently the diplococcus pneumoniae of Fränkel or the bacillus pneumoniae of Friedländer does not play such an important part in the otitis media of scarlet fever as in that due to other causes.

In fact, the results of bacteriological work upon this subject seem to echo one another, and perhaps about all that is known might be condensed into the statement that the streptococcus and pneumococcus are the microbes most frequently found in the early stage of an otorrhœa (Lermoyez and Helme³⁷_{Jan., '95}). Later, a secondary affection appears, in many instances due to the presence of the staphylococcus albus. This latter micro-organism enters the tympanic cavity from the nasal chambers or through the auditory canal. It is of importance, for the latter reason, that all pledgets of cotton and other substances used to remove the discharge from the ear in the early stage of suppuration should be thoroughly aseptic. Such pledgets can readily become dangerous sources of infection if the surgeon's fingers are not surgically clean. All the appliances used in the acute stages of suppurative otitis must, for the same reason, be aseptically clean.

Lermoyez and Helme make the practical suggestion that a ready means for sterilizing the pledget is to have by one a bottle of a saturated solution of boric acid in alcohol; also, an alcohol-lamp. The pledget, fastened as usual to the holder, is to be dipped in the alcohol and then held to the flame of the lamp. The cotton, thus scorched, is sterilized in a moment without losing any of its absorbent power. Cultures made upon gelatin with cotton thus treated have always been found to be negative. The paper of Lermoyez and Helme is most important, as it suggests a very strong probability that, without care in the aseptic elements of treatment in a case of acute suppuration of the middle ear, micro-organisms may be introduced by which the acute inflammation will be altered to a subacute or chronic otorrhœa.

Where the middle-ear cavity has become infected by the tubercular process, Guranowski³³⁶_{Mar., 30, '95} believes that any attempts at surgical treatment cannot give the excellent results that follow surgical interference in joints affected by this same form of inflammation.

Resort should be had to such interference in tubercular otitis media in those cases alone where it is necessary to liberate retained pus.

Hartmann, of Berlin, ¹¹⁸_{Aug., '95} has studied the subject of otitis media in the newborn. He refers to the statements of Tröltzsch, Wresch, Wendt, and Moldenhauer, that otitis is very frequent in the newborn and in sucklings. Kossel, in autopsies on 108 infants 1 month old, found a lesion of the tympanum in 85 cases. In 38 of these he found pus in the middle-ear cavity containing Fränkel's diplococcus, the streptococcus, the bacillus of Friedländer and that of Pfeiffer (pseudo-influenza bacillus). Hartmann has examined 47 infants, finding 37 cases of otitis,—bilateral in 28 instances. The appearances within the ear in this affection are infiltration and redness of the drum-head, often a projection of the posterior half of the membrane, and disappearance of the apophysis. It is often difficult, at this early age, to distinguish the limits of the meatal walls and the margins of the drum-head. In doubtful cases Hartmann suggests that an exploratory puncture should be made.

The general and functional signs of this affection in such young children are restlessness at night, the frequent placing of the child's hand to the affected ear, the cry, and symptoms of meningitis. Broncho-pneumonia is the most frequent cause of death (24 out of 37 cases). The micro-organisms found did not differ from the list named by Kossel. Otitis, Hartmann thinks, may be the origin of a general infection, as the bacillus pyocyaneus has been found in the pia mater and in the blood of the heart.

Treatment.—Hoover, of New York, ⁵⁹_{July 6, '95} recommends the use of tincture of iodine as very efficient in suppurative otitis media. The applications should be made two or three times a week with a probe wrapped with cotton. There is no pain and the burning sensation ceases entirely when the air is shut out by a pledget of cotton.

Nichols, of New York, ⁸¹⁴_{May 1, '95} employs for otorrhœa an alcoholic solution of alumnol, 5 grains (0.32 gramme) to 1 ounce (30 grammes) of alcohol, in preference to an alcoholic solution of boric acid. The alumnol, being astringent and only slowly soluble in water, retains its drying power for a long time and seems but slightly irritating to either the membrane or the skin. Although remote from this subject, yet appearing in the same paper, is a suggestion regarding the best method for cocainization of the middle ear. Nichols finds it best to introduce a small ball of solid benzoinol with 20 per cent. of cocaine into the fundus. This melts readily and produces a much quicker and more lasting anæsthesia than does a watery solution.

Trichloracetic acid, for the destruction of granulations within the tympanum, is recommended by Okuneff, of St. Petersburg.²⁰⁷
The acid is fused into a fine ring or loop on the end of an iron wire, and when applied to granulations it spreads quickly, the superabundant acid being then syringed away. To anesthetize the parts a cocaine solution $\frac{1}{7}\frac{0}{0}$ or $\frac{1}{7}\frac{5}{0}$ is employed.

Eitelberg, of Vienna,³³⁶
May 18, '95 reports 150 cases of drum-head perforation since the beginning of the year. The course of treatment in acute cases averaged about twenty days; in chronic cases, eighty-five days. Thorough cleansing, the air-douche, paracentesis in all cases suggesting the need of drainage, and boric acid were the principal measures resorted to. He warns against overzeal in surgical procedure.

[It is of interest to note that the treatment used by Eitelberg to-day does not differ, to any marked extent, from that which he taught his pupils ten years ago.—C. S. T. and A. A. B.]

The importance of a climatic treatment for chronic suppurative otitis media is referred to in an article by Hessler, of Halle,³⁴
Dec., '94 who, in the management of these cases, recognizes three important elements: (1) a rational local treatment of the ear, nose, and posterior nasal region; (2) care that the patient lives in a clear, pure atmosphere; (3) the protection of the patient from new infection of the nares and posterior nares and from secondary inflammation of the ears. Regarding the second element of treatment, Hessler refers to the excellent results following the transference of children, with otorrhœa and caries of the tympanic contents, to the Riviera. When such a place is beyond the means of parents, pure air should be sought for in the wooded or mountain regions near at hand or by the sea. The third element is also most important, especially for children. This is to be accomplished by (1) thorough disinfection of school-rooms, and (2) exclusion from schools of all sick children or of children coming from homes where sickness exists. The purification of the rooms must be accomplished by a thorough method of disinfection, not simply by airing the rooms once or twice weekly.

Among the new instruments of service in the diagnosis of disease of the middle ear may be mentioned a new electrical otoscope devised by Mauri, of Barcelona.⁴⁹⁴
Sept. 15, '95

An aural auscultation-tube was devised by Cheatle, of London,²
Sept. 22, '94 to avoid irritation of the meatus by shifting of the nozzle of the tube. It consists of a light, nickel-plated spring, hinged in the middle, having at one extremity a small catch holding the nozzle (which is made of wood covered with a removable nipple of soft rubber), the other extremity plain, for resting lightly

on the head. It fits either ear, is extremely comfortable, and, when the spring is folded and the nozzle removed from the catch, takes up very little room. The spring for the patient is not nickel plated, and the nozzle for hospital work is better of plain wood, for the sake of cleanliness, a white bone one being used for syphilitic cases.

A useful device for holding a pus-pan under the ear is suggested by Cummins, of Wheeling, W. Va. ^{Dec. 15, '94}

Wingrave, of London, ^{Dec. 8, '94} uses a self-retaining aural polypus-forceps which he recommends as having advantages over the ordinary instrument, a strong, cross-acting spring being substituted for the slide which is the usual device for clamping the ordinary forceps.

Otitis Media and Neuroses.

Lannois, ^{Sept. 15, '95} in an article on the aural origin of certain cases of paralysis of the facial nerve, states his belief that examination of the ear is made too infrequently in cases of facial paralysis. Not alone in suppurative otitis media, but in the sclerosing form of this affection, also, it is possible for the inflammatory process to extend to the facial canal and involve the nerve. The most common origin of this source of involvement is an acute coryza, which includes the Eustachian tubes and middle ear in a general catarrhal inflammation. Lannois names certain symptoms as of value in diagnosis,—namely, clonic spasm of the muscles in the zone supplied by the facial nerve; a diminution of hearing, or hyperacousis, due to the paralysis of the stapedius muscle; the pains characteristic of inflammation of the middle ear or about the mastoid process or neck of the condyle. Treatment naturally consists in the necessary procedures for the cure of the otitis media.

According to Lake, of London, ^{May, '95} the period at which facial paralysis occurs is very variable, particularly in children. It may be the first symptom of tympanic inflammation, it may precede or accompany pain and external discharge, or it may be a later symptom and appear a few days or weeks after the onset of otorrhœa. These remarks are illustrated by the following cases: 1. C. B., aged 1½ years. Pain in left ear for one week, then left facial paralysis was noticed; the pain continued for another seven days, when otorrhœa set in and the child was brought to the hospital. 2. B. C., aged 40. Acute otitis. Otorrhœa and facial paralysis appeared on the same day. 3. A. B., aged 4. Influenza. Double profuse otorrhœa; two weeks later, double facial paralysis. 4. G. C., aged 47. Acute otitis media suppurativa for two weeks and then facial paralysis on same side. 5. L. M., aged 7. Otitis

media suppurativa nine weeks ; then facial paralysis occurred and the child was brought to the hospital.

In respect to the frequency of the onset of facial palsy in recent cases, he finds that it occurred four times in 658 cases of suppurative otitis. These cases were consecutive cases during two years, the total number of ear cases seen during that period being 1250. (St. Thomas's Hospital.)

The methodical and efficient treatment of these cases of acute otitis, complicated with facial palsy, appears to be best conducted in the following way. In infants: (1) a free incision of the membrana tympani should be made; (2) antiseptic irrigation should be carried out every six hours; (3) hot boric fomentations should be applied every two hours; (4) Some boric-acid ointment may be applied to the outer part of the meatus and the pinna to prevent eczema. In the adult the same treatment should be adopted, but, in addition, two or three leeches should be applied over the mastoid and one over the tragus; and the leeching may be repeated if it appear desirable. Electrical treatment of the muscles may aid recovery after long neglect, as was illustrated by one of the cases reported.

Haug, of Munich, ³⁷_{Apr., '95} mentions a case of paralysis of the chorda tympani following the instillation of glycerin-phenol in the left ear. The strength of the solution used was 1 to 10, employed to relieve the pain in a case of acute otitis media attending an attack of gripe. The sense of taste was lost on the left side of the tongue, the right half being unaffected. This case is the only one which has occurred in the experience of the writer.

Bruck, of Berlin, ³⁴_{Sept. 10, '95} has observed five cases in which neuralgia of the temporo-maxillary joint was associated with disease of the ear. His patients were females. There was some doubt as to whether there was a false localization of the pain within the ear or whether it was due to a neuritis of the auriculo-temporal nerve. Therapeutic treatment has been of value, consisting in the use of arsenic with or without iron. Psychical influence also appeared to have decided effect upon some of the subjects.

Collet, of Paris, ¹¹⁵³_{Jan. 12, '95} has made a study of the ears in tabes and states that patients affected with bulbar tabes may exhibit cutaneous ulcerations of the face, nose, and auricles, the symmetrical distribution of which demonstrates its trophic origin. The lesion of the middle ear in tabes is sclerosis of the inner wall of the drum-cavity and the inner surface of the membrana tympani. This may arise from the changes in the trophic nerve of the cavity, coming from the fifth nerve, which is affected centrally. The sensory and trophic changes in the skin of the auricle and

face in tabetics lend support to this hypothesis. This sclerosis, as well as the lesion of the fifth nerve and tabes itself, may all be parasyphilitic.

Suppurative Otitis Media with Mastoiditis.

Suppurative Inflammation of the Middle Ear.—Any sharp separation of the subjects of otitis media and mastoiditis must always be theoretical, and is rendered still more difficult, from a literary stand-point, by the rapid increase of methods of treatment for both the aural cavities involved at the same time. It has seemed best, therefore, to place the reports of such methods in a distinct section, as they deal inclusively with both the middle ear and the mastoid cells.

Since the introduction of Stacke's surgical method for opening the antrum and middle ear into one cavity and the modification of this method by the more thorough procedure of Schwartz, these operations have been generally adopted for a class of cases in which the aurist was formerly content to cleanse the tympanum, with its accessory cavities, by medication, or surgical operation through the external auditory canal, or, at most, by resorting to the old classical method of opening the mastoid cells. Stacke's and Schwartz's methods have been so generally accepted in Europe and are so favorably regarded in America that they are now well-established surgical procedures and will undoubtedly become more and more universally adopted, to the exclusion of the older forms of treatment.

Before taking up this subject in more detail it seems in place, here, to quote from a most timely paper by Burnett, of Philadelphia, ⁹ upon the prevention of mastoid empyema, read before the American Otological Society at its annual meeting in 1895. Burnett's views upon the proper treatment of an acute inflammation of the middle ear are in accord with those of Schwartz, Gradenigo and Pes, Lermoyez and Helme, and may be summed up in the general admonition: non-irritation of the inflamed parts, with loose, light, antiseptic dressings, introduced by surgically-clean hands and instruments. He states that the proper treatment of an acute otitis media is largely negative, after either spontaneous or artificial opening in the membrane has occurred and a discharge set in. The inflammation of the middle ear being due to pathogenic germs (streptococci) in the middle ear, to which they have gained access from the naso-pharynx, the endeavor on the part of nature, generally successful, is to afford them an exit from the tympanum by a spontaneous rupture of the membrana. Then a natural siphonic action sets in, which empties the mastoid antrum

and saves the mastoid cavity if this siphonic current is not stopped by irritative interference.

For the reasons mentioned, all forms of inflation of the tympana should be carefully avoided in this disease (acute otitis media), not only for the welfare of the ear already infected with pathogenic germs, but also to avoid forcing similar germs into the as yet unaffected ear. He has long since found it advisable never to inflate the ear, by any method, in either acute nasal or aural disease, because it has proved to be both painful and injurious.

In acute otitis dry heat will never do any harm and may give relief. An instillation of 10 drops of a warm, watery solution of carbolic acid (2 per cent.) or of mercuric chloride (1 to 10,000) may also give relief, if the congested membrana can endure the mechanical presence of such a column of fluid, which, he has observed, it rarely can. Such applications, however, tend to destroy staphylococci, always present in the auditory canal, and thus render the middle ear less liable to secondary infection through the perforation in the membrana when it occurs. As soon as the membrana is perforated and a discharge sets in, or even before this takes place, immediately after paracentesis, the medical attendant should insert simply a strip of iodoform gauze or carbolic-acid gauze, an inch and a half long by one-fourth inch wide, into the auditory canal for antiseptic drainage purposes, place a tuft of the same gauze in the concha, and let the ear alone for twenty-four hours, when the same kind of dressing may be re-applied if the previous dressings are moist, or let alone for twenty-four hours longer if they are dry. At no time does he syringe the acutely-inflamed ear or put anything into it but the dressing mentioned, and he finds that the middle ear heals rapidly and the perforation closes.

Since January of this year he has seen in consultation six cases of mastoid empyema,—one chronic and five acute,—all the result of improper treatment of the primary otitis media by syringing with hydrogen dioxide, insufflation of boric acid, inflation of the tympana, etc.

As a preliminary operation to opening the antrum of the mastoid, in cases of suppuration from the attic and antrum, Barr, of Glasgow, ²_{Nov. 24, '94} advocates the removal of the malleus. He has resorted to this procedure in six cases of chronic suppurative otitis media. In every one of them the discharge had been persistently offensive, in spite of regular antiseptic cleaning. After extracting the malleus sharp spoons were used to clear out the attic, as well as to scrape away the softened bony edge of the Rivinian segment. In none of these cases was the incus found, as in this inflamma-

tory process it is probably destroyed by erosion or is displaced so as to be beyond the range of instruments introduced through the external canal. The therapeutic results from these operations have been improvement in all cases, but in none a permanent cure.

Pause, of Halle, ¹³⁶_{Sept. 1, '96} reviews the results obtained by Stacke's operation and by the Stacke-Schwartz modification during the years 1891-1892. Stacke's method was employed in 12 cases, with only 2 complete cures. Schwartz's modification was employed in 57 cases, with 31 cures.

McBride, of Glasgow, ³⁶_{June, '95} favors all rational efforts at free drainage, without committing himself to the methods of any one man. Regarding the type of operation known as Stacke's, he remarks that in many cases the auditory function is already so far injured that any danger of making it worse may be ignored. The facial nerve may be injured in any mastoid operation, but it runs most risk of suffering when the bridge of bone left after the posterior wall has been removed and the mastoid antrum exposed is attacked. He has more than once been compelled to leave it because of twitching of the face during attempts at its removal. Again, it must also be remembered that in these cases intensely septic cavities are being dealt with, and, unless there is reason to believe in the existence of intra-cranial suppuration, nothing should be done by the removal of healthy bone to bring them into communication with the cerebral structures. Diseased bone is, of course, septic and may be freely removed. When the middle ear and its surrounding cavities have been thoroughly opened, McBride syringes thoroughly with 1 to 2000 perchloride solution at the time of operation, then dries out carefully, fills the cavities with a mixture of boric acid and iodoform, and plugs the wound and the meatus with sterilized iodoform gauze. If the posterior wall of the meatus has been removed, it is of very great importance to plug the meatus first, lest stenosis should result. There is often a good deal of oozing within the first twenty-four hours after the operation; so that it may be necessary to change the dressings on the following day. After this the frequency of the dressing must depend upon the time the parts remain sweet. It has appeared to him that irrigation is better not employed so long as there is no smell from the dressings. His experience has usually been that a complete cure of the suppuration is the exception rather than the rule, although the discharge may be reduced to a minimum, and thus lead a casual observer to infer a cure. For this reason he is inclined to make free use of the lead nail, which can be worn without discomfort, and which permits of thorough cleansing with

antiseptic liquids in those cases which have failed to be cured by the dry method of dressing. If, however, the lead nail require to be employed after such operations, he is by no means sure that the simple opening of the antrum according to Schwartz's method is not in many cases preferable to the more modern operations which include removal of the posterior wall of the meatus. He has not so far practiced Zaufal's operation exactly as the latter describes it, and can quite imagine that it may give a larger proportion of absolute cures than other less energetic methods; but extensive operations in this region must of necessity involve the risks alluded to above.

Barr, of Glasgow, ¹¹_{Sept., '95} in a paper on the treatment of intractable middle-ear suppuration by operation through the mastoid, states that in his hands the globular dental burr had proved a far more serviceable instrument than the chisel and gouge, the clean surface left by the burr enabling the operator to estimate the direction and depth.

At the meeting of the British Medical Association for 1895, Macewen, of Glasgow, ¹¹_{Sept., '95} opened a discussion on "Cerebral Complications in Relation to Middle-Ear Diseases." He drew the attention of the meeting to three points: (1) as to some fallacies in localization, (2) the necessity of early recognition of tuberculous disease of the middle ear, and (3) the importance of bacteriology in aural surgery. It was impossible to depend on the presence or absence of bone-conduction in differentiating between cerebral and cerebellar abscess. The great point was to thoroughly remove all foci of pyogenic infection. Tubercular disease of the middle ear might reach an advanced stage without any perforation of the membrana tympani. He drew attention to the vast importance of careful antiseptics in aural operations, and brought forward the following propositions: (1) that the extension of infective disease from the middle ear to the brain and its membranes was preventable; (2) that when disease was established in the middle ear it should be thoroughly eradicated; (3) that when brain trouble had been set up it was necessary to remove not alone the infected part, but also the path by which infection had traveled.

Jasinski and Orzel, ³³⁶_{May 4, '96} in an article on a new method of attico-antrotomy, recommend that these areas be laid open and connected with the auditory canal by means of Collin's perforator, the crown of which should be one centimetre in diameter, and one-half centimetre in diameter for children. Having detached the auricle with the posterior soft wall of the auditory canal, the parts are drawn forward and downward; the posterior bony wall of the auditory canal is perforated by the instrument, which is

then carried on into the antrum. Another opening is made into the mastoid process at the external border of the auditory canal and the two perforations united into a single opening.

Nash, of Bradford, Eng., ⁶_{Aug. 2, '95} reports two cases of septicæmia due to middle-ear disease, in both of which recovery followed operative interference. The first case was that of a boy, aged 12 years, who for five years had suffered from suppurative otitis media. Septic pleuro-pneumonia followed a blow upon the head, and the condition appeared to be desperate at certain stages of the illness. The second case was that of a boy, 15 years of age, who had suffered intermittently from suppurative otitis media of the left ear for two years. Subdural abscess developed with septic thrombosis of the lateral sinus, and recovery followed an operation for ligation of the internal jugular vein.

Buck, of New York, ¹⁹_{Feb. 2, '95} reports a case of acute inflammation of the middle ear terminating in purulent periphlebitis of the lateral sinus and thrombosis, with operation and recovery. The present case and others of a more or less similar nature recorded in medical literature justify, in Buck's opinion, the establishment of a rule something like the following: The persistence of deep-seated pain behind the mastoid process after the antrum has been opened into and thoroughly drained is sufficient warrant for making an opening into the sigmoid groove for the lateral sinus; and it is not advisable to wait until the patient has chills or until the body-temperature rises to an appreciable degree before resorting to operative interference in this direction. If corroborative evidence furnished by the last-named symptoms be waited for, lives that might otherwise be saved will be lost.

This case is almost unique in the rapidity with which the inflammatory process extended from an acutely-inflamed tympanum to the mastoid cells and deeper structures. This rapid advance may be explained by supposing that the inflammation had made considerable headway in the adjacent bone, especially the part lying near the posterior end of the tympanum and around the antrum. Certain anatomical peculiarities may also have existed, which would favor the rapid spread of inflammation in this special case.

M A S T O I D .

Hartmann, of Berlin, ⁶⁶_{Jan., '95} ¹_{July 27} by anatomical investigations upon horizontal sections through the middle of the external auditory meatus, and by making vertical sections through the inner end of the meatus and perpendicular to the axis of the latter, has sought to determine how far chiseling of the posterior wall of the

meatus is associated with danger for the facial canal and for the labyrinth, and particularly for the semicircular canals. He found that, if chiseling is done through the posterior wall of the canal into the drum-cavity, the facial or semicircular canal may be wounded if the chiseling extend one to four millimetres back of the sulcus tympanicus. He considers chiseling of this posterior wall unnecessary, since the lower part of the tympanic cavity is readily accessible to manipulation through the meatus. Where the attic is involved, an operation exposing the cupola space and antrum becomes necessary, but it should be remembered that if the antrum

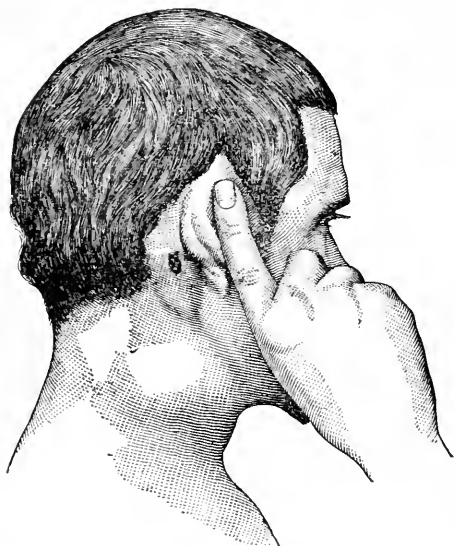


FIG. 1.



FIG. 2.

RESULT OF A WILDE INCISION, CAUSING NEURITIS OF THE FACIAL NERVE.
(CHIPAULT AND DEMOULIN.)

Annales des Maladies de l'Oreille, etc.

be penetrated too deeply the labyrinth will be injured. A permanent cure may often be obtained by the employment of the tympanic cannula, the removal of granulations by the curette, the extraction of the ossicles, and removal of a portion of Rivini's segment with the forceps-chisel.

Chipault and Demoulin³⁷_{Apr., '96} refer to the disadvantages of Wilde's incision, and report two cases of purulent otitis media in both of which Wilde's incision was employed. The authors believe that this procedure, instead of relieving the symptoms of beginning mastoiditis, caused the introduction of infection into the system, and produced, in one case, neuritis of the facial nerve, and, in the other, a necrosis of the transverse process of the atlas. (See Figs. 1, 2, and 3.)

Broca and Lubet-Barbon, of Paris, ¹²⁶ July 15, '95 also strongly denounce Wilde's incision and believe that it should be abandoned for more radical measures. They favor the Stacke method of operation in cases of mastoid suppuration. From statistics of one hundred and forty-three cases they insist upon the necessity of prompt intervention and the use of radical measures, and their published reports appear to justify their views in this respect. Buck, of New York, ⁵⁹ July 20, '95 has met with four cases presenting a variety of inflammation of the mastoid characterized by absence of pain.

All are of an acute character and all were characterized by pain at the onset; that is, at the time when, presumably, the inflammation was still confined more or less strictly to the tympanic

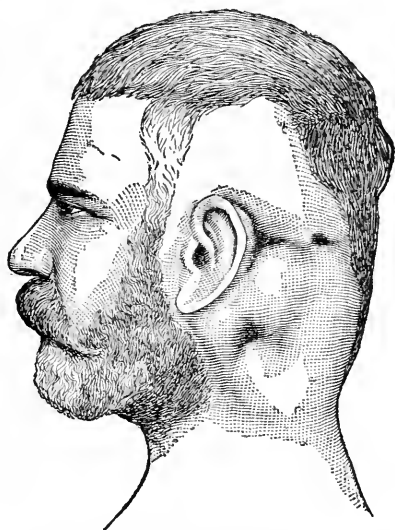


FIG. 3.—RESULT OF A WILDE INCISION, CAUSING NECROSIS OF TRANSVERSE PROCESS OF THE ATLAS. (CHIPAULT AND DEMOULIN.)

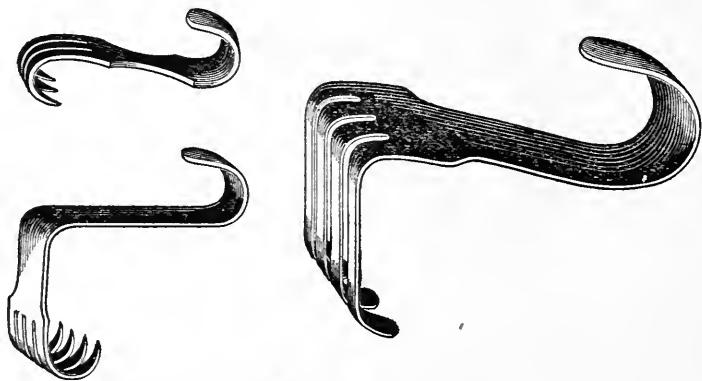
Annales des Maladies de l'Oreille, etc.

cavity. After this initial period, which lasted from a few hours to two or three days, there was either no pain at all or the pain was of such a migratory character and so little pronounced as scarcely to attract the attending physician's attention to the ear as its starting-point, or, finally, the symptom only developed when some special exciting cause—like violent physical exercise—called it forth.

The origin of this painless variety of mastoiditis is obscure. The author simply suggests the possibility that among the various living organisms which, in suitably-constructed mastoid processes, produce serious inflammation and ultimately destruction of the

tissues involved, there may be one or more species which create toxins possessing a decidedly anæsthetizing power over sentient nerve-fibrils. As a proof of the reasonableness of such a belief he points to the painlessness of tubercular inflammations of the middle ear.

The etiological aspects of these cases are, however, it seems to him, of far less importance than their practical bearings, which may be briefly summed up as follows: first, serious disease of the mastoid process may co-exist with an insignificant amount of pain in the affected region; and, second, of all the physical evidences of disease in this part of the temporal bone the one that is most rarely lacking is a prolapsed condition of the skin lining the upper and posterior wall of the external auditory canal in close proximity to the membrana tympani. At a more advanced stage of the



RETRACTORS FOR MASTOID OPERATION. (THORNER.)

Deutsche med. Wochenschrift.

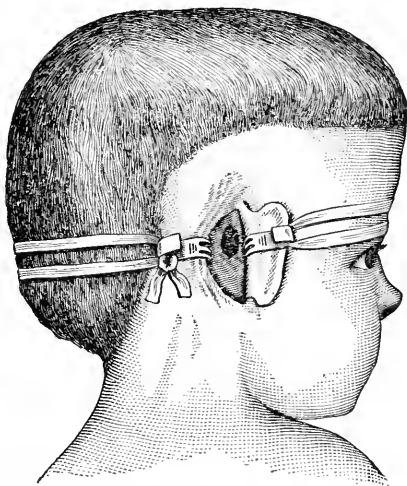
disease or under more favorable anatomical relations this prolapse may extend throughout the entire length of the canal.

In opening the mastoid cells in one of these cases Buck removed a single chip of bone-substance, about one millimetre in thickness, at a point just behind and a little above the curving posterior and upper margin of the entrance to the osseous external auditory canal. In this unusual position for its course he exposed the outer wall of the lateral sinus. The exigencies of the case required that the sinus should be exposed very thoroughly, which was done without accident. The patient recovered, but Buck states that no case could illustrate more forcibly than this the danger which attends the employment of the drill as a means of establishing a drainage channel between the mastoid antrum and the outer world. Having been in former years a strong advocate

of the use of this instrument, he feels now that he should lose no good opportunity of warning against its employment.

Thorner, of Cincinnati, ⁶⁹_{Aug. 29, '95} has devised a new set of retractors for mastoid operations, illustrated by the accompanying cuts. As will be observed, the retractors, after being applied to the margins of the wound, are held by a small bandage passed around the head of the patient, thus doing away with the service of an assistant to hold these instruments.

Lemcke, of Berlin, ³⁴_{Mar. 26, '95} reports his experience with four cases of acute caries and necrosis of the temporal bone after influenza. The rapid progress of the inflammatory process bore but slight resemblance to the ordinary course observed when the mastoid is



METHOD OF APPLYING RETRACTORS. (THORNER.)
Deutsche med. Wochenschrift.

involved during an attack of acute otitis media, but had the greatest similarity to acute osteomyelitis.

Davidsohn, of Berlin, ⁴_{Dec. 17, '94} who has had an unusually good opportunity to study a case of diabetic otitis media, says that many authorities on otology and general medicine have favored the opinion that in diabetes a form of mastoiditis may appear which does not follow an acute inflammation of the middle ear, but which is itself primary and involves the tympanic cavity in a secondary inflammation. Davidsohn's case leads him to believe that in this instance, at least, the inflammation originated in the tympanic cavity as the result of "a cold," but that the weak resisting-power of the tissues, resulting from the systemic disease (diabetes), favored the rapid extension of the inflammation to the mastoid cells and

the remarkably rapid and destructive process there induced,—a process which did not disappear after operative treatment, but which changed for the better immediately after the proper course of treatment for diabetes had been instituted. The rapidity of the destructive process within the mastoid, in such a case, might readily lead one to suspect that the aural complication had there had its primary seat.

Davidsohn warns against a hasty determination to operate, in subjects known to be suffering from diabetes, until proper general treatment has been tried. This treatment must, of course, be employed after the operation has been performed, in cases where operative interference is plainly necessary. He urges, also, the importance of making urinary tests for sugar in all cases of mastoiditis which appear to require operation. In his own case the existence of diabetes was not suspected at the time of the operation.

Goldstein showed a case of exfoliation of the cochlea before the St. Louis Medical Society.¹⁰⁹_{Mar., '95} The patient was a colored boy, 6 years of age, suffering from necrosis of the internal ear. The “cochlea and deep structures of the petrosa,” which he found to be necrosed, were removed, and throughout the entire course of treatment following operation there was neither pain, vertigo, tinnitus, nor nausea. An hour after operation the patient was up and walking home with equilibrium unaffected, and with some hearing-power remaining on affected side. He died, however, in a couple of weeks, acute miliary tuberculosis being apparently secondary to the aural disease. The examination of the affected temporal bone corroborated the statements made regarding the character of the necrosed and exfoliated areas. All landmarks of the osseous external meatus and tympanic cavity had disappeared, but the superior wall and part of the posterior portion of the internal auditory meatus remained intact. There was no evidence of any meningeal lesion, tubercular or otherwise.

Buy, of Brussels,⁶⁸⁸_{July 18, '95} reports a case of necrosis of a part of the occipital bone during the course of an attack of mastoiditis.

Sinus-Thrombosis and Cerebral Abscess.

The technique of the operation of trephining for cerebral abscesses of aural origin is very fully treated in an article by Hansberg, of Dortmund, Germany.⁶⁶_{Jan., '95} The methods of trephining employed in cases of brain-abscess of otitic origin are very numerous in relation to the small number of operations performed. This is probably because there is as yet nothing upon which to base a localization of the abscess and thus to determine the most suitable spot for trephining.

If the individual cases reported be examined it will be found that all operators, with the exception of Chauval, Schede, and Greenfield, trephined somewhat behind and above the osseous meatus, often, indeed, above the posterior bounding-line given by von Bergmann. According to statistics, cerebral abscesses of aural origin occur both in the cerebrum and the cerebellum; further, the great majority of cerebral abscesses occur in the temporal lobes and the fewest in the occipital lobes, and, from reports of various authors, it may be concluded that the temporal lobe and the cerebellum are almost exclusively the seat of abscesses of otitic origin. The depth to which the brain may be penetrated in probing for an abscess depends upon the point on the lobe chosen for trephining. Hansberg never penetrates deeper than three centimetres, and is of the opinion that it will very seldom be necessary to go deeper. It must be remembered that generally abscesses arise in the temporal lobe and then extend inward. They can thus be reached, as a rule,—if not too extensive,—at a depth of three centimetres. The diagnosis and locating of a cerebral abscess are most difficult, as the symptoms attending its development are of quite a vague nature,—headache, loss of appetite, nausea, etc. The reason for the slow development of suggestive symptoms is the fact that, at the onset, a temporal abscess is located in the white substance, and only upon development does it extend to the cortex or central ganglia, as the case may be. The abscess brings about paresis or functional troubles only when it attacks the cortex, either directly or indirectly, or the central ganglia,—that is, when it attacks the portions of the brain bordering on the temporal lobe. Clinical histories published up to the present time confirm what is already known, that, ordinarily, death follows soon after focal phenomena of a motory or sensory nature arise. These symptoms may have been preceded by disturbances of a more general and vague nature, together with symptoms of intracranial pressure. These latter symptoms make the diagnosis of cerebral abscess probable, but, in the absence of focal disturbances, do not allow of a certain diagnosis or of the localization of the abscess.

In spite of the absence of focal disturbances, however, other means permit of determining the point to which surgical interference must be directed. For instance, it is known that abscesses of the temporal lobe generally appear after disease in the tympanic cavity, especially after disease in the mastoid antrum and in the roof of the mastoid. Cerebellar abscesses, on the other hand, are more frequent after diseased processes in the region of the posterior fossa, especially after those which originate in the osseous

sigmoid sulcus and in its neighborhood. The old teaching of von Bergmann, that the abscess nearly always lies at a distance from the primary disease, and separated from the same by a layer of unaffected brain-substance, may be true, but such cases may be considered as the exception, and not the rule. Hansberg is inclined to the view that abscesses developing far from the place of the primary trouble are to be observed principally in acute cases of suppuration.

As no doubt can remain that in the great majority of cases the abscess lies in close contact with the petrous bone, it is evident that in trephining the instrument must be placed and kept close to this bone. If an abscess is not found near the petrous bone, if all signs which locate it more exactly in the temporal lobe fail, and if the symptoms still point to a cerebral abscess which cannot be located in the cerebellum, Hansberg recommends making punctures with the needle in at least ten or fifteen places.

Early operation is to be urged, in the first place, because trephining is not so dangerous as has been claimed, and, in the second, because a cerebral abscess can suddenly cause death without having shown any characteristic premonitory or focal symptoms.

Regarding abscesses in the cerebellum, Hansberg suggests that, if the relation of the cerebellum to the pyramid and to the mastoid be considered, it will be found that it lies for a considerable extent immediately upon these, and all suppurative processes which take place in the posterior part of the petrous portion and mastoid will endanger the cerebellum. Unfortunately, cerebellar abscesses present even fewer characteristic signs from which a diagnosis can be safely made than do cerebral abscesses. All pathological products that take up intra-cranial space lead oftener to bilateral choked disc when in the cerebellum than in other portions of the brain. The presence of this sign can, therefore, be taken as an indication of cerebellar abscess.

Nimier, of Paris, ⁵_{Apr., '95} urges the necessity of prompt treatment by the aurist of all purulent processes in the middle ear. The necessity for operations for sinus-thrombosis will thus, in most instances, be avoided. Hessler ³²⁸_{B.38, II.1, 2, '94} states that, of 9 cases of pyæmia of otitic origin which he has collected, recovery occurred in 6; 1 case died from metastatic pyopneumothorax and 2 from phlebitis of the lateral sinus. When no lung involvement occurs the prognosis is favorable, but the existence of such condition need not serve as a contra-indication for operative measures. In more than half the cases of pyæmia from suppurative otitis the graver symptoms could be avoided by prompt opening of the

mastoid antrum, either with or without removal of an existing thrombus in the sinus. The prognosis depends upon the existence of free drainage after the removal of all purulent foci and upon the recuperative power of the patient.

Abbe, of New York, ⁵⁹July 27, '95 reports four cases of sinus-pyæmia and jugular thrombosis. One recovery followed operative measures for relief, but the other cases terminated fatally. Bull, of New York, states that cases are not rare in which sinus-thrombosis may occur from suppurative otitis media without any mastoid symptoms.

Chipault, of Paris, ²⁹⁰July 30, '95 advises the treatment of phlebitis of the lateral sinus by curettement of the sinus.

Moss, of San Antonio, Texas, ⁶⁶Jan., '95 reports two cases of cerebral abscess following suppurative otitis media, with mastoiditis and sinus-thrombosis, in which recovery was secured by operation. Thomas, of London, ⁶May 18, '95 met with a case of abscess of the cerebellum caused by obstruction to the drainage of a suppurating middle ear, by the presence of a large polyp in the external auditory canal.

In a paper upon intra-cranial abscess and sinus-thrombosis resulting from purulent otitis media, von Bergmann, of Berlin, ⁸¹⁴Aug. 1, '95 states that the results of treatment of the thrombosis of the sinus by opening and irrigating are very good; death is almost inevitable if expectant treatment be adopted in this condition. It is better to ligate the jugular vein (best at the junction of the facial) beforehand, as metastasis has been known to follow immediately on the sinus operation.

Broca, of Paris, ³⁷May, '95 lays equal stress upon the importance of surgical interference, as does Ducellier, of Paris, ¹³⁶Aug. 15, '95 and Picqué, ¹²⁶July 15, '95

[The practical lesson which the work of the year in this branch of surgery emphasizes is that the graver complications of mastoiditis, where the meninges or cerebrum or the great vessels are involved, need not, at the present day, be regarded as necessarily hopeless and fatal. Experience has shown that these conditions, once the despair of the physician, are within the range of modern surgical procedures. A still more valuable lesson is the knowledge that these graver complications can be avoided by prompt resort, in all cases indicating the need, to the methods of Stacke and Schwartze for giving free drainage to attic, antrum, and mastoid cells. But still more valuable, for the general practitioner, is the assurance, as given in Burnett's article on the prevention of mastoid empyema, ⁹Aug. 17, '95 that even resort to these modified mastoid operations can, in the majority of cases, be

avoided if every patient suffering from acute otitis media is treated by aseptic, antiseptic, non-irritating methods for the otitis itself and for the usually attendant post-nasal catarrh.—C. S. T. and A. A. B.]

INTERNAL EAR.

Alderton, of Brooklyn, ⁶⁶_{V. 23, No. 3, '94} has studied the middle register in thirty-six cases with normal hearing and over six hundred with the various forms of aural disease, by means of Hartmann's series of five tuning-forks, ranging at intervals of 1 octave from C with 128 to C⁴, with 2048 double vibrations per second. He gives elaborate, but clear, tables of the results of these tests in cases classified according to their nature and according to the effects produced by treatment, affording thus important diagnostic and prognostic data. His conclusions are: 1. Intensity or duration, Rinné, showing bone-conduction to be greater than air-conduction ($BC > AC$) or equal to it ($BC = AC$), always indicates some middle-ear disease, either alone or as a complication. 2. In any peripheral disease sufficient to produce any degree of deafness, intensity Rinné $BC > AC$ or $BC = AC$ will be found to exist if a low-enough fork be used in the testing, providing the internal ear is normal or nearly so. 3. The duration of BC is increased over the normal in affections of the sound-conducting apparatus, except for the highest notes (C⁴ and over), the explanation of this exception existing in the fact that the sound-conducting apparatus is not concerned in the transmission of high notes. 4. In affections of the sound-conducting apparatus sounds of a low pitch are poorly heard by AC , while high-pitched sounds are relatively well perceived. 5. The higher up the scale of forks the intensity negative Rinné travels, the greater the degree of sound-obstruction existing in the sound-conducting apparatus, as a rule. 6. The increase of bone-conduction is not to be explained by Steinbrügge's theory of hyperæsthesia of the nerve. 7. Any profound or prolonged middle-ear affection ultimately affects the labyrinth secondarily. 8. Curtailment of the duration of BC to any extent indicates the presence of some internal-ear disease, either alone or as a complication. 9. "Intensity," Rinné's (as we practice it) and Schwabach's (absolute duration of BC) tests combined, furnish more valuable assistance than "duration" Rinné or Weber's test. 10. When the entire series of tuning-forks is used it is not necessary to adopt any arbitrary whisper-limit [Lucæ's.—D. G.]. 11. It is possible to have $BC > AC$ or $= AC$ with a higher fork, even with the next lower giving $AC > BC$. 12. The prognosis cannot be certainly established on these tests beyond the fact that,

when negative Rinné has climbed up to the C⁴ fork, not much, as a rule, can be hoped for through treatment. 13. Duration of B C becomes almost or quite normal when normal conditions are restored. 14. A good deal may be founded on results obtained by means of two forks,—the C¹ 32-64 V or Dench's 26-64 V clamped fork for Rinné's test and the C³ 1024 V to determine absolute B C. 15. Possibilities of error are best avoided by employing the whole series. 16. The apparent exceptions to the above conclusions may possibly be explained by further investigations, the writer still pursuing his experiments.

Grant, of London, ¹¹_{Oct., '94} in an article upon "The Better Appreciation of Rinné's Test," recommends the use of Gardiner Brown's model of tuning-fork instead of the low-pitch fork usually employed. Brown's fork vibrates five hundred and twelve times per second, is light in construction, convenient to manipulate, and, while vibrating just sufficiently long to permit of differential observation, is not so wearisome as to deter one from routine use of the various tuning-fork tests, each of which calls for the confirmation by means of the other. Its use tends, also, to avoid the chance of causing exhaustion of the auditory nerve of the observer and of the patient. Such exhaustion can become a fruitful source of error in diagnosis.

Gradenigo, of Turin, has made a series of observations based upon the assertion of Roosa, that the ability to hear the voice at a distance proportionally greater than the distance at which the sounds of a clock can be heard is a symptom of disease of the cochlea or of the acoustic nerve. Gradenigo concludes that four principal types of cases may show a disproportionate relationship in the ability to hear these two classes of sound: 1. Aphonic voice and clock with strong tick heard at about the same distance,—a rare type appearing in slight affections of the sound-conducting apparatus. 2. The voice heard about three times farther than the clock,—a more frequent type, found in nerve affections of the sound-conducting apparatus. 3. The voice heard at a still greater distance,—fifty times farther than the clock, as in disease of the inner ear in young subjects. 4. The clock heard farther, sometimes ten times farther, than the voice,—a rare type seen only in hysterical conditions and quite characteristic of this affection.

"Hearing for Speech and Hearing for Tones in General and the Measurement of the Latter by Gradenigo's Auditory Field" is the subject of an article by Zwaardemaker, of Utrecht. ⁶⁶_{V. 23, No. 4; June, '06} ¹¹ Diminution of hearing for tones must naturally carry with it diminution of hearing for speech. Hearing for speech is measured by Oscar Wolf's method, noting the distance a whisper is

heard as a numerator and taking as denominator the distance at which the same word is heard by the normal ear. The accepted normal distance of seventeen metres for whispering is considered by the author as really a maximum far above what is required for ordinary hearing. The estimation of hearing for tones is effected by means of tuning-forks extending over a great range,— C^{-2} , C^{-1} , C , C^1 , C^2 , C^3 , C^4 , C^5 , C^6 ; practically there must be tested the lowest boundary-tone, the hearing-power for C , C^2 , and F^4 , and the upper boundary-tone. This can be plotted out on a chart divided into semitones along its base line (abscissa) and into amount (percentage) of hearing-power, as compared with the normal on the co-ordinates. By joining these points (which may be further multiplied) a picture of the “field of audition” can be obtained, and the superficial extent of this can be taken as a basis of comparison at different ages and in different diseases of the organs of hearing. It can also be compared with the hearing for speech. In sclerosis hearing for speech is usually less than for tones.

Gradenigo⁶⁶ states that monaural diplacusis is rare and is usually harmonic,—that is to say, the false tone is separated by a definite harmonious interval from the true and is in fact one of its overtones abnormally audible. In a case described by him it was more distinct as the tone of the tuning-fork with which it was tested became weaker. The phenomenon was perceived by bone- as well as air- conduction, and was due to middle-ear catarrh. Binaural diplacusis is also sometimes harmonic and due to catarrh or other abnormality of one middle ear. It is, however, occasionally disharmonic, the false tone being perceived about one-half or one-third tone higher or lower than the true, owing to an affection of the internal ear.

Daac, of Christiania,⁶⁶ ¹¹ finds difficulty in ascribing harmonic diplacusis to disease of the internal and disharmonic to that of the middle ear absolutely. He quotes a case of diplacusis in which the interval between the sounds heard by the two ears, respectively, was not harmonic—that is to say, the false note was not an harmonic (overtone) of the true—and in which the symptom disappeared under treatment adapted exclusively to middle-ear disease. He allows that if in a given case the symptoms indicate a middle-ear affection and double hearing is present for air-conduction, but not for bone-conduction, the double hearing may be attributed to an affection of the sound-conducting apparatus.

Gellé, of Paris,³⁷ ⁵ finds that aural inhibitions are frequent and easily produced in neurasthenics and hysterical subjects. Such patients he terms “inhibitropes.” Audition may be inhibited by concentrated attention, preoccupation, and functional activity of

other viscera, as during digestion and pregnancy. Clinical observation shows also that the hearing is altered in ulceration of the larynx and of the isthmus of the pharynx (which latter also causes earache) and in dental caries, etc. Inhibitions originating in auricular irritation are frequent and intense; thus, a foreign body—as a cerumen-plug, and the introduction of the ear-funnel—may cause sudden aphonia, spasmodic cough, and difficult deglutition.

Everything causing compression of the labyrinth or any abnormal tension of the auditory apparatus predisposes to central incapacity and dulled intelligence. Acute and chronic otitis are often attended with defective vision. Vasomotor activity is influenced markedly by affections of the labyrinth, pressure on the stapes causing injection of the conjunctiva. In sclerotic otitis disturbances in the capillary circulation of auricle and face are sometimes very marked. In a case of multiple recrudescant polypi in the ear, after extraction, Gellé observed a double exophthalmos develop without alteration in the pulse or thyroid body. Dryness of the fauces and of the skin of the auditory canal has long been noted as secretory inhibitions in sclerotic otitis media. Affections in the mucous membrane of the Eustachian tube cause paresis of the adjacent palatine muscles and consequent autophony and aphonia. Otitis may affect the chorda tympani, resulting in dryness of the corresponding side of the tongue and in impaired taste. Paresis of the sterno-cleido-mastoid and torticollis may appear on the side of the diseased ear. Most remarkable of all is the inhibition of one ear by the other. Thus, a concussion of the labyrinth on one side may be followed by great impairment on the uninjured side by inhibitory action of the affected ear.

Grant, of London, ⁶_{Aug. 24, Sept. 14, '95} advises the use of Delstanche's rarefacteur in labyrinthine disturbance due to sudden loud noises or explosions for the purpose of restoring to a normal position the indriven tympanic structures and stapes. Pilocarpine is not contra-indicated in inflammation of the auditory nerve due to meningitis, but, on the contrary, is to be recommended in recent cases in view of the fact that the labyrinth is usually implicated. In the use of the galvanic current in cases of nervous tinnitus the positive pole should be applied to the tragus. When one ear only is being galvanized the current should not exceed from 2 to 4 milliampères, and it is only when the current is divided between the two ears, both being treated at the same time, that it is at all advisable to double the strength of the current. He draws attention to the functional element in many cases of nerve-deafness as explaining disappointments and successes in treatment otherwise difficult or impossible to account for.

Jones, of London, ¹¹_{Sept., '95} makes the statement that a long residence in India will sometimes cause nerve-deafness. Neither pilocarpine nor galvanism has been of service in his experience. Barr, of Glasgow, at the same meeting of the British Medical Association, referred to the importance of recognizing the fact that nerve-deafness is accompanied frequently by middle-ear disease.

Connal of Glasgow, ²¹³_{Sept., '96} reports a case of necrosis and exfoliation of a part of the cochlea, and tabulates from the literature seventeen cases of necrosis of the labyrinth. He finds that the prognosis in these cases of labyrinthine necrosis is much more favorable than at first one would be inclined to suppose. A mortality of 15 per cent. (including Bezold's statistics with his own) is certainly not high when the situation of the lesion is considered. In reading over the literature of the subject one is impressed with the fact that, in the great majority of the cases, after the removal of the sequestrum, the suppurative process is materially lessened; in many of them it ceases altogether. Again, the facial paralysis, which was such a prominent symptom in many of those patients, in some instances was permanent, in others only transient. Even in the cases where the canal for the facial nerve was involved in the sequestrum, and its removal must have resulted in severe laceration of the nerve, there are cases recorded where, after a time, the nerve has partially or entirely recovered its function. In one instance the whole of the left labyrinth was removed as a sequestrum through an opening in the mastoid process. There was facial paralysis, complete, to all the muscles supplied by the portia dura, including the tongue. In about ten days after the operation there was a marked improvement, and at the end of two months the facial paralysis had obviously greatly diminished.

DISEASES OF THE NASAL AND ACCESSORY CAVITIES, PHARYNX, LARYNX, AND ŒSOPHAGUS.

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NASAL CAVITIES.

Anatomy, Physiology, and Histology.

G. Killian, ⁴²_{Aug., '95} after examining one hundred and ninety embryos, has come to the conclusion that the formation of folds in the mucous membrane of the septum begins at the fourth month and lasts to the seventh and eighth month, and that retrogression already begins at the ninth month. This latter continues often until complete disappearance of the mucous folds; however, in about 31 per cent. of the cases there remains a more or less developed elevation which can be perceived in the living. Killian ascribes a respiratory function to these folds; they serve to increase the surface which moistens and warms the air breathed. The current of air also affects the direction of the folds. He demonstrates that the slow change in the human nose alters the respiratory path and that the object of the folds is done away with. G. Scheff ³⁷_{Dec., '94} conducted experiments on the cadaver which proved that in the adult the greater part of the air passes through the middle nasal canal, and that the former division into respiratory and olfactory regions seems to be inexact from a physiological stand-point. In the accessory cavities differences of pressure occur in deep respirations which are parallel to those that arise under similar circumstances in the nose itself. If the respirations are very deep the variations are never so great as they are said to be by Braune and Clasen (60 millimetres of mercury or 780 millimetres of water). It is, therefore, certain that the theory of these authors, that the accessory cavities have a certain influence on the direction of the air in the olfactory region, is erroneous.

G. Franke, of Berlin, ¹³⁶_{May 1, '95} also concludes that, the accessory cavities being, as they are, placed as unfavorably as possible as regards the renewal of the air contained in them, all theories

attributing to them a physiological part based on the renewal of the air in their interior has no foundation. The accessory cavities can help neither to moisten nor warm the air breathed any more than they can increase the power of olfaction. The nasal fossæ are so disposed as to fulfill their various functions; the accessory cavities possess no function and have nothing to do with respiration.

[In advancing the opinion that the accessory sinuses possess no function the author probably alludes to respiration and olfaction only, for their usefulness as resonance cavities is generally recognized.—C. E. S.]

Harrison Allen, of Philadelphia, ^{Feb. 2, '96} after demonstrating two skulls showing the effects of cretinism on the shape of the nasal chambers, states that, in patients in whom he detects a bulb-like forehead with unnaturally projecting occiput, with depression between it and the parietal bone, where the external nose is dwarfed (or even, as opposed to this, the nasal bones are preternaturally high), the hard palate is small, and the posterior nares are of inordinate size, he would not hesitate to characterize such individuals as cretinoid. If these conditions existed in persons of small stature (here not speaking of typical dwarfs), he would feel more than ever satisfied in using such a term in describing them.

H. Zwaardemaker, of Utrecht, ^{June, '95} in a study of the qualitative defects of the olfactory sense, states that in the few cases in which observations have been made the power of recognizing certain odors has been absent—for example, those of vanilla, mignonette—without the sense of smell for any other things being affected. As only a few accidental observations can be cited, it is, for the present, impossible to completely recognize all the departures from the normal in this particular sense. The author tries to elaborate a natural classification of smell,—a task also undertaken by Linné for the drugs then in use. With the new chemical preparations two classes have been added; so that the whole number now amounts to nine. The classes have been revised, and in some respects subdivided, and both physiology and perfumery have been called upon with this view. The nine classes are: (1) ethereal odors,—*e.g.*, acetic and butyric ethyl-ether; (2) aromatic odors, with several subclasses,—*e.g.*, camphor, aldehyde; (3) balsamic odors, with subclasses,—*e.g.*, keton, cumarin; (4) amber odor, with two subclasses,—*e.g.*, musk, trinitro-butyl-toluol; (5) garlic odor, with three subclasses,—*e.g.*, sulphide of ammonia, ichthyol; (6) empyreumatic odors,—*e.g.*, tar, creasote; (7) caprylic odors,—*e.g.*, lactic acid, butyric acid; (8) repressive odors,—*e.g.*, coriander-

seed, opium; (9) nauseating odors,—*e.g.*, scatal-wood (*Anagyris foetida*).

Marcel Lermoyez, of Paris, ²¹²_{Sept. 25, '96} publishes an excellent review on disturbances of the olfactive sense.

St. Clair Thomson and R. T. Hewlett, of London, ²⁰⁵⁶_{V. 78, '96} in a valuable paper on the bacteriology of the nose, gave the results of experiments performed by them, which, while opposed to the views at present entertained, nevertheless tend to throw much light upon the methods employed by nature to protect the lower and more sensitive mucous surfaces against pathogenic organisms. As is well known, about five hundred litres of air, bearing, on a low average, about fifteen hundred organisms, are inspired every hour. As all, or at least the greater portion, of these came in contact with the moist mucous membrane lining the tortuous passages of the nasal fossæ, it is generally taken for granted that the interior of the nose must show a rich profusion of micro-organisms. To control this theory—*e.g.*, to determine the presence or absence of bacteria—a simple method was adopted to insure uniformity of comparison. Thirteen healthy individuals were examined, and from these twenty-seven cultures and fourteen cover-glass preparations were made from the vestibule of the nose, while seventy-six cultures and thirty cover-glass preparations were made from the mucous membrane of the nasal cavity, the cultivations being made on agar and cover-glass preparations stained with gentian-violet. The results were summarized as follows: 1. In all bacterioscopical investigations of the nasal fossæ, in all researches as to the action of nasal mucus, etc., a clear distinction must be made between the vestibule of the nose and the proper mucous cavity. The former is lined with skin and is furnished with hairs and with sudoriparous and sebaceous glands; it is not part of the nose-cavity proper, but only leads to it. 2. The neglect of this distinction may account for the discrepancy in previous observations on the subject. Contamination with the lining of the vestibule is difficult to avoid, even when this source of error has been realized. 3. In the dust and crusts of mucus and *débris* deposited among the vibrissæ of healthy subjects micro-organisms are never absent. They are rarely scanty in number; as a rule they are abundant. 4. On the Schneiderian membrane the reverse is the case. The authors do not assert that micro-organisms are completely absent; obviously, some must occasionally occur, but, under normal conditions, they are never plentiful; they are rarely even numerous, and in more than 80 per cent. of their observations no organisms whatever were found and the mucus was completely sterile. 5. The occurrence of

pathogenic organisms must be so infrequent that their presence on the Schneiderian membrane can only be regarded as quite exceptional.

Hypertrophic Rhinitis.

Pathology.—George Boenninghaus, of Berlin, ¹¹⁵¹_{B.3.H.3} found mucous glands sparsely distributed in the hyperplastic epithelial layer of the respiratory region. These glands are formed of highly refractive cylinder-cells, such as those found in normal mucous membrane, grouped around cylindrical depressions, which depressions secrete mucus. The cells forming the acini cannot be distinguished from the “goblet” cells of the normal membrane, and possess, like them, a reticulated protoplasmic structure. The ducts usually take an oblique direction from the glands proper toward the surface; so that on section they are always cut off, causing the gland to present the appearance of a rounded eye in the midst of the surrounding epithelial cells.

J. Wright ⁵_{May, '95} publishes an article on the vascular mechanism of the nasal mucous membrane and its relations to certain pathological processes, and suggests that part of the function of the muscular tissue of the vein is to antagonize excessive contraction of the artery. The muscle-fibres in the areolar tissue act like the tunica albuginea of the penis in driving the blood out of the tissues when the radical veins are opened. In chronic rhinitis the veins are thickened by the growth of non-elastic fibrous tissue; in hypertrophic rhinitis there is not only a dilatation of their walls, but also a paresis. Atrophy has a primary elimination of the muscular element with encroachment on the vessels by this fibrous tissue, with subsequent absorption of part of the tissue. The dry stage of acute coryza is due to the turgescence of the capillary net-work which surrounds the orifices of the glands, thus closing them.

Pegler, of London, ¹¹_{July, '95} alluding to the “turbinal varices” of Wingrave (see ANNUAL of 1895, vol. iv, D-5), states that, while his own microscopical examinations were of a nature to corroborate this investigator's views, he had this last year been led to take a somewhat simpler view of the morbid changes, since, in every specimen examined, he had found mucoid degeneration in greater or less degree, and in no instance a true hypertrophic condition of the sinus-walls. This applied to growths taken from any point along the free border of the inferior turbinate, from the middle turbinate, and from the septum. In a section of the inferior turbinate the walls of the sinuses were constituted by strands of visceral muscle-fibre crossing in all directions and interlaced with

bands of the wavy, areolar tissue of the part. Another section, taken from a typical "anterior hypertrophy" of the inferior turbinate, the external contour of which was deeply convoluted, showed long, finger-like processes in the section. This character was probably answerable for the fact of "papilloma" being commonly applied to such growths, but, instead of a dense coating of stratified epithelium (altered by irritation?), with a thin line of vessels included, a primary vascular outgrowth in a mucoid matrix, put forth apparently from the main body and bordered by delicate, ciliated epithelium, was present. The mucoid degeneration of areolar tissue was conspicuous in the lymphoid and general submucous area of the growth. Comparing carefully with the normal, it would be seen that this change had conspicuously attacked the walls of the venous sinuses, the mucoid thinning out of the areolar element throwing into prominence the muscular constituent and creating an appearance of actual muscular hypertrophy. Two other sections showed probably later stages of the pathological process (apparently progressive in character), the muscular trabeculae themselves disappearing till a mere rim surrounding some of the spaces remained. Wingrave believed that dilatation followed this atrophic stage, and proposed the term "turbinal varix" to designate it, but he also recognized an hypertrophic condition of the sinus-walls in other cases.

Acute Rhinitis.

C. M. Fenn, of San Diego, Cal., ⁸¹⁴_{Sept. 15, '95} recalls his discovery in the nasal and pharyngeal secretions of certain luminous bodies, which, under the low power at command, appeared to be spores. These, by reason of their highly refractive and glistening appearance and constant presence, were believed to be of bacterial origin and to bear an etiological relation to the disease. Upon this hypothesis, at least, sodium bisulphite was suggested and has been employed successfully since that time. He now advises a saturated solution of sodium bisulphite in tablespoonful doses, repeated every hour or two or until the intestinal gases manifest its presence.

R. Wunsche, of Dresden, ²¹¹_{Nov. 10, '95} advises the use of mentholated chloroform, at 5 or 10 per cent., in inhalations. The technique is as follows: The hands are to be rubbed with a few drops of the liquid and are then held before the nose and mouth, while from four to six deep breaths are taken. The attacks of sneezing disappear from the first inhalation; the nasal secretion increases at first, then diminishes, and finally ceases after one or two inhalations performed during the day.

The following procedure, recommended by Unna, of Hamburg,⁷⁷_{Feb., '96} sometimes gives rise to excellent results: At the outset of the coryza the nasal cavities are to be sprayed with a small quantity of a mixture of 1 part of ichthyol and 100 parts each of ether and alcohol. This application of the spray is to be made only once.

Valentin, of Berne,¹²¹_{Apr., '96} states that tumefaction is relieved and secretion diminished, sometimes disappearing completely in less than two hours, by

- R Sulfanilic acid, 2 drachms (8 grammes).
 Carbonate of sodium, 1½ drachms (6 grammes).
 Distilled water, 2 fluidounces (62 cubic centimetres).
 M. Sig.: Tablespoonful every hour.

Atrophic Rhinitis.

Pathology.—More, of Winterthur,⁶⁶_{No. 4, '94} examined 80 cases at the otological clinic of Bâle, and insists on the uncommonness of the unilateral form. He noted the coincidence of atrophic and hypertrophic rhinitis in 18 cases out of 80. The rhino-pharyngeal mucous membrane is usually involved, but it is much more uncommon for the mucous membrane of the larynx and trachea to be affected. Complications of the inner and middle ear are frequent,—47 per cent. according to the statistics of the author,—a higher figure than that given by the majority of authors. While propagation is easily understood when the middle ear is involved, nervous deafness, which the author found relatively more frequent in his cases, notwithstanding the youth of the patients, would seem to point to a constitutional factor.

W. A. Martin, of San Francisco,¹⁴⁷_{May, '96} in a report made to the Medical Society of the State of California on this disease, argues that all the symptoms and histological changes point to a lesion in the trophic nerves, causing a retarded or an arrest of development.

J. Payson Clark, of Boston,⁹⁹_{Oct. 3, '96} gives the results of his examination of the nose in 100 healthy and 100 phthisical patients. Of the 100 non-phthisical individuals, in 56 the turbinates were practically normal; in 1 case they were hypertrophied; in 25 cases they were slightly atrophied; in 17 moderately atrophied, and in 1 case markedly atrophied. In none of these cases was there a ridge or deviation which could be considered as seriously obstructive. The pharynx was noted as being atrophic, or as showing a chronic inflammatory condition, in 14 of these cases. A slight amount of atrophy in the pharynx was quite common. Of the phthisical individuals examined 21 presented marked atrophy of the turbinates, 32 moderate, 20 slight, and 27 none. In other

words, there were over 50 per cent. of the cases with sufficient atrophy of the turbinates to be distinctly noticeable. The author thinks that it is fair to assume that, in a large proportion of the moderately atrophic cases, this condition had existed prior to the pulmonary disease and was independent of it.

Treatment.—T. Passmore Berens ¹¹⁷¹_{v. 2, p. 94, '95} ⁸¹⁴_{July 15, '95} obtained encouraging results from the use of ichthyol in the treatment of a number of cases of atrophic rhinitis fœtida. In severe cases he applies a large cotton tampon, saturated with undiluted ichthyol, inserted into each nostril and allowed to remain fifteen minutes. The patient then finds it easy to expel most of the scabs, which latter become loosened by the copious secretion produced. All the sinuosities, especially the spaces between the turbinated bodies and the outer wall of the nose, are then cleansed with cotton saturated with ichthyol, using considerable pressure in rubbing, thus massaging the mucous membrane with pure ichthyol. In less severe cases, or where the scabbing is slight, the tampon is not used.

Joseph Gibb, of Philadelphia, ⁹_{Dec. 8, '94} reports a large number of cases illustrating the value of zinc stearate, combined with 25 per cent. of euophen, as a stimulant, applied with an insufflator after cleansing, in the treatment of atrophic rhinitis.

Ozæna.

Fage and Moynier de Villepoix ²³⁰_{June, '95} conclude that Loewenberg's microbe undoubtedly greatly resembles the pneumococcus of Friedländer, with which certain bacteriologists confound it; it possesses the same form, capsule, reaction toward the aniline dyes, the same decoloration by Gram's method, and the same aspect in most cultures. The microbe described by Frisch in rhinoscleroma also resembles it to a certain extent. Under the hypothesis of the identity of these bacilli, which may be found even in healthy cavities, it is difficult to explain, however, why it should be constantly present in patients suffering from ozæna, while absent in other varieties of rhinitis.

Siegmund Moritz, of Manchester, ⁹⁰_{July, '95} states that in ozæna the septum is, as a rule, relatively shorter and the naso-pharynx deeper than normal. This defective development of the septum is a part of the abnormal growth of the rest of the nasal skeleton, and it could scarcely be understood how this could be acquired; it must, therefore, be congenital. With this congenital defect in the bony structures of the nose, the mucous membrane also remains backward in its development, thin and tender, deficient in glands, and susceptible to inflammatory and catarrhal processes. A further proof of a congenital disposition to ozæna may be found in the

fact, repeatedly observed, that ozæna is hereditary and runs in families.

Sulzer ¹⁷¹_{Jan., '95} relates two cases of optic neuritis apparently occurring as a complication of ozæna. In one case in proportion as the state of the nose improved the ocular troubles disappeared. In the second case similar lesions occurred in the optic nerve with ozænous rhinitis, and similar improvement of the ocular disease followed after cure or improvement of the ozæna.

Capart, of Brussels, ⁸⁶⁸_{July 27, '95} insists upon the contagiousness of ozæna. He has often seen the husband consult him some years after marriage, for ozæna contracted from his wife, and often a mother suffering from ozæna communicates the affection to her children by giving them her handkerchief. Heredity, too, seems to play an important part.

Treatment.—Sänger ¹¹⁶_{Oct., '94} adopts the theory of Zaufal concerning the pathogenesis of ozæna, and thinks that the slowing of the inspiratory current in the nasal cavities which are too large exerts an unfavorable influence upon the circulation of the pituitary membrane. To counteract this he recommends a nasal obturator formed of a U-shaped spring, which, by grasping the lower part of the septum, supports on either side a flat piece of tin. The blades, standing out horizontally at the entrance of the nostril, narrow the latter sufficiently to restore to the inspiratory current its normal rapidity, without, however, compelling the patient to breathe by the mouth, even during effort.

Muschild ⁹⁹⁶_{Apr. 25, '95} uses the following formula with the atomizer (the glycerin prevents the formation of crusts by causing an abundant watery secretion, and the sodium borate prevents the decomposition of the exudation):—

R Pure glycerin,	. . . . .	70 grammes (2½ ounces).
Sodium borate,	. . . . .	20 grammes (5 drachms).
Distilled water,	. . . . .	30 grammes (1 fluidounce).

About 1 cubic centimetre (15½ minims) of the solution having been atomized into each nostril, the author after a few minutes removes the softened crusts; he then cleanses the mucous membrane of the nose with cotton, and again strongly atomizes so as to reach the entire nasal region and even the naso-pharynx. The patient is charged to renew the atomizing twice or thrice during the day. The odor vanishes in a few days; the secretion continues to exist in a liquid state, and the patient no longer needs the aid of the physician in order to cleanse the nasal fossæ. This simple treatment is exceedingly efficacious and may be used in simple atrophic rhinitis and in dry pharyngitis.

G. Hunter Mackenzie, of Edinburgh, ²_{Apr. 27, '95} assimilating the

disease to that met with in the skin in certain forms of eczema, endeavored by curettement to supplant the diseased membrane by new tissue, and met with success in several instances. Oily applications, such as a mixture of ichthyol and olive-oil, were found beneficial after curetting. The patients upon whom this method of treatment succeeded were young,—that is, from 10 to 25 or 30 years of age. With reference to the above, G. Metcalfe, of Newcastle, ^{May 4, '96} states that in 1894 he had published the results of three cases permanently cured by curettement.

Cheval ^{June 22, '96} has tried interstitial electrolysis, the bactericidal action of the current having been demonstrated by Apostoli and Laquerrière, and that of copper oxychloride by Gautier. On the other hand, the leucocytes are sensitive to the action of the poles, especially of the positive pole. The following technique is employed: After inducing local anæsthesia a copper needle, aseptitized in an alcohol-flame, is inserted into the mucous membrane of the middle turbinated bone or through its very substance; the other needle—a steel one—is thrust into the mucous membrane of the lower turbinated bone of the same side, as far as possible between the mucous membrane and the bone. The length of the sessions and the intensity of the current should be regulated according to the seriousness of the case and the sensitiveness of the patient. Sometimes one session is sufficient; at times several are necessary, from eight to fifteen days apart. Electrolysis of both nostrils may be carried out during the same sitting without causing inconvenience.

Membranous Rhinitis.

Pathology.—J. Czernietzka ⁸⁸ _{Sept. 20, 27, '94} reports a case in a nursing. At the post-mortem examination the diagnosis was confirmed and double lobular pneumonia found. Bacteriological examination revealed Klebs-Löffler bacillus in the nasal membrane. Treitel and Koppel, of Berlin, ¹⁵⁸ _{B. 19, H. 1, 2, '96} also report two cases in which the Löffler bacillus was found, and D. Braden Kyle, of Philadelphia, ¹ _{July 6, '96} observed twenty-three cases, eight, or a little more than one-third, of which revealed no diphtheria bacilli. Gerber and Podack ³²⁶ _{B. 54, '96} describe five cases, observed in Lichtheim's polyclinic in Königsburg, in all of which extensive membranes were formed. The membranes were found to be composed of polynuclear leucocytes in which numerous bacilli of Klebs-Löffler were detected. In some cases bacilli were likewise found over the tonsils. In one case only could bacilli be demonstrated in the secretion of the nose prior to the development of the membrane.

Beausoleil ¹³⁶ _{Dec. 15, '94; Jan. 15, '96} does not accept the view that membranous

rhinitis exists as an entity. He argues that macroscopical examination has never revealed any other lesions than those of ordinary inflammation; the affection, always localized to one of the nasal fossæ, is always cured as soon as the mechanical expulsion of the caseous masses is accomplished. The affection differs from true auricular cholesteatoma (Cozzolino, Wagnier) by the fact of the absence of any enveloping membrane and of any recurrence after treatment. Furthermore, the affection presents the symptoms of various primary nasal affections; foreign bodies, syphilis, and, above all, obstruction, whether dependent upon the septum or the turbinated bones or due to suppuration of the accessory cavities. The secretions and desquamation products of the pituitary membrane gradually accumulate, their elimination being impossible on account of the narrowness of the natural passages; the bacteria of decomposition, and more especially a long, filamentous microbe, decompose the magma, giving it its singular odor and consistency. Scheinmann³⁴_{No. 25, '94} states that, notwithstanding the very frequent discoveries recently made of diphtheria bacilli in rhinitis fibrinosa, no case has terminated fatally, neither has contagion occurred; consequently, clinical observation is against its being diphtheria.

Mazyck P. Ravenel, of Philadelphia,⁹_{May 18, 23, '95} considers the disease as a form of nasal diphtheria, and, therefore, always a source of possible contagion. The patient should, consequently, be isolated as carefully as are those affected with the more common types of diphtheria, until the absence of the Klebs-Löffler bacillus has been shown. The author describes fourteen cases, all of which were examined, and concludes that, while cases presenting the Klebs-Löffler bacillus, even of a virulent type, seem to lack in infecting power, this is probably due to the feeble vitality of the organism.

Felsenthal³⁴_{Jan. 15, '95} refers to the reported cases in which virulent diphtheria bacilli have been present. In one of two cases of this disease the author also found the diphtheria bacillus, but it was of slight virulence; in the other case no such bacilli could be demonstrated. He considers that while in the majority of cases rhinitis fibrinosa consists of a form of diphtheria, it has been shown that even in undoubted cases of true diphtheria the bacilli have not a constant virulence. Nevertheless, the author lays stress upon the fact that in the present state of our knowledge a case in which the diphtheria bacillus is found should invariably be isolated.

Nasal Polypi.

P. McBride, of Edinburgh,¹¹_{Oct., '95} states that, while growths corresponding in character to mucous polypi have not often been seen

to spring from the inferior turbinated body or below it, in the last-named situation we meet with a variety of tumor which has been described as papilloma. It differs from the mucous polypi in its red color and papillary surface, but its microscopical structure is similar. Such growths rarely, if ever, spring from the upper regions of the nose. He therefore considers that there are two varieties of growths differing in macroscopical characters only, but histologically identical,—one found almost always growing from the upper parts of the nasal cavity, while the other found only in the lower. This fact suggests that position has much to do with the macroscopical characters of polypi. If this were to prove true, it follows as a corollary that their etiology can in part be explained by physical laws.

The author considers that social position to some degree modifies the course and occurrence of nasal polypus. Among the wealthier classes (1) the disease appears to be somewhat more frequent in women than in men; (2) it is most common after middle life, the greatest number of cases occurring between sixty and seventy as against twenty and thirty in hospital patients.

Guyé, of Amsterdam, ¹¹_{Aug., '95} discussed the theory of Woakes,—*e.g.*, that mucous polypi are caused by necrosing ethmoiditis; the theory of Grünwald,—*e.g.*, that polypi are secondary to empyema of the accessory cavities of the nose; and the criticism of Zuckerkandl upon these two theories, to the effect that there is no sufficient pathological evidence in favor of either of them. The author's clinical experience supports Zuckerkandl's criticism, and he mentions a few cases which lead him to the conclusion that the mucous membrane of the nose has a peculiar predisposition to the production of mucous polypi as a reaction to noxious influences of very different nature. He considers that these noxious influences are, in rare cases, to be found in purulent disease of the maxillary or other sinuses,—in ozæna, rhinoliths, chronic catarrh, irregularities of the septum, etc.,—but that in the large majority of cases they remain undetected.

Luc, of Paris, ¹¹_{Aug., '95} contends that it was only since the publication of Ziem's work with regard to the detection of pus in the antrum of Highmore that an etiological relationship has been acknowledged between empyema of the antrum and nasal mucous polypi of the middle meatus,—that region of the nose with which the pus comes more particularly in contact. He maintained that this relationship, if it is really frequent, is certainly not constant, and he cited many cases in which he himself had found no evidences of suppuration in the neighborhood and where the cheeks have been equally translucent on the two sides. The

author reviewed the theory that necrosing ethmoiditis is a constant etiological agent in the production of mucous polypi, and criticised Woakes as passing over in silence the conditions under which such lesions develop. He suggests that this author may have artificially grouped under a common name lesions of different nature. Reports of microscopical examinations are quoted of cases of mucous polypi where no lesion of the underlying bone was to be found. The author concluded that the mucous membrane of the middle meatus, in consequence of its peculiar structure, presents a special tendency to myxomatous degeneration; that this degeneration may be the consequence of a local irritation, such as is produced by the continuous discharge of pus through the hiatus semilunaris, or by the presence in the neighborhood of a neoplasm of another nature (frequent co-existence of a mucous polypus with cancerous growth); but also that this degeneration may take place without any appreciable provoking cause and with all the appearance of spontaneity.

Ripault, of Paris, ¹⁰⁰_{Nov. 3, '94} calls attention to the frequency of the implantation of nasal polypi in the middle meatus, and to the histological difference found between the true nasal polypus, a real myxoma, and the retronasal polypus, the nucleus of which is formed of myxomatous tissue covered with fibrous tissue.

John Dunn ⁸¹_{Mar., '95} states that venous obstruction anywhere in the nasal mucous membrane may result in the production of polypi, and cites a case in which the anterior end of the middle turbinate was hypertrophied and so elongated as to make firm pressure for a space of several millimetres, the breadth of the polypoid growth, against the nasal process of the superior maxilla, just posteriorly to the area from which the polypoid growth took its origin.

Goldstein ²⁰³¹_{'94} reaches the conclusion that mucous polypi are not at all uncommon in individuals under 16 years old. Among seventy-three cases examined, five, or 6.85 per cent., were found in individuals below that age.

Knyvett Gordon ¹¹_{July, '95} showed to the Laryngological Society of London a section of a middle turbinate body with polypoid formation. Although there was no dead bone to be seen or felt in the nose, and no operation had been performed in that situation, yet there was, microscopically, well-marked caries of the bone, as shown by the destruction of tissue, with well-marked small-celled infiltration and numerous osteoclasts.

O. Kalischer, of Berlin, ¹¹⁵¹_{v. 2, No. 2, '95} by means of methylene-blue stain, succeeded in demonstrating the presence of nerves in mucous polypi and in recognizing, in contradiction to the usual opinion,

that their presence is not uncommon, some growths containing but a few and others many. They may be distinguished by various characteristics. In the first place they often run a long distance without decussating; nuclei are to be seen at rather regular intervals, which cause a swelling of the nerve, suggesting nerve-fibres of recent formation.

Dunbar Roy, of Atlanta, ¹¹⁷⁰_{July, '95} reports a case in which the history of nasal obstruction went back to so early a period in the infancy of the patient that the growth could fairly be considered as of congenital origin.

Scanes Spicer, of London, ³_{p.559, '94}; ⁸¹⁴_{Mar.1, '95} exhibited to the London Clinical Society a girl, aged 17 years, of a neurotic temperament, with slight exophthalmos; pulse, 140 to 196; marked elastic enlargement of the thyroid, associated with bruit and pulsation and breathlessness. Both nostrils were distended with nasal polypi, presenting anteriorly and also in the naso-pharynx. Coincidentally with the mere removal of the polypi the size and pulsation of the thyroid lessened, the pulse fell to 120 to 130, while the exophthalmos and tremors disappeared. The assertion has been made that intra-nasal operation may excite Graves's disease, but the foregoing case illustrates the association of the two diseased states. Fraenkel and others have reported like cases, which were similarly benefited by freeing the nostrils.

W. Spencer Watson ²_{Nov.2, '95} reported a case of nasal polypi associated with tachycardia, the latter being relieved after removal of the nasal obstruction.

Manasse ³³⁶_{Aug.10, '95} states that polypi containing bone are rarely described, he having only discovered but one article on the subject, that of Zarnike, who reported seven cases of these formations. Manasse observed it in four individuals, in whom the polypi grew from the middle turbinated bone. They showed a central cavity with well-marked marrow-holes. The pedicle could be followed to the base of the projection. Manasse looks upon them as due to hyperplastic formation of the periosteum.

J. B. Scott, of Gettysburg, Pa., ⁹_{Mar.16, '95} reports a case of asthma and anæmia completely relieved by removal of nasal polypi. The only interesting fact in connection with the case is that it seems to afford a strong plea for the more general examination of the nasal passages in diseases of the respiratory tract and also of the circulation. Although treated by physicians of reputation, some of whom were eminent, the result was invariably the same at their hands,—temporary improvement. Not one of the physicians examined the nose. Thomas Hubbard, of Toledo, Ohio, ¹¹²_{Apr., '95} reports a case of spasmodic stricture of the œsophagus caused by nasal polypi.

Treatment.—Guye, of Amsterdam, ¹¹_{June, '96} removes polypi in the choanæ as follows: He pushes Wilde's snare through the nose, and then introduces the right forefinger through the mouth into the naso-pharynx, when, without any difficulty, the snare is found and made use of to remove a portion of the polypoid growth. The loop is then drawn home with the other hand and the polypus is extracted. This method has almost always succeeded well, even in cases where other practitioners, after frequently-repeated endeavors by means of the galvano-caustic snare, have only removed small fragments.

Beausoleil, of Bordeaux, ³_{Aug. 14, '95} recommends decortication of the pituitary membrane if the pedicles of the growths are spread out broadly, whether in the vault, the middle turbinated bone, and in the superior and middle meatus, and if the mucous membrane be hypertrophied, granulating, and covered with small granulations, which are so many small, diffuse polypi.

In such cases Beausoleil decorticates the entire diseased mucous membrane by means of special forceps so shaped as to allow their introduction into all the anfractuositities for the removal of all the granulating and degenerated membrane. Various precautions are to be taken when operating in the superior meatus and toward the vault.

Five or six sittings are usually sufficient. Each operation should be done under the strictest asepsis. When the growths are due to suppuration of the accessory cavities (inflammation of the maxillary, frontal, ethmoidal sinuses, etc.), the original affection should, of course, first be eradicated.

[The above measure is certainly a radical one, and is attended with considerable risk if utilized for the removal of tissue above the lower portion of the middle turbinated bone.—C. E. S.]

J. W. Gleitsmann, of New York, ¹⁰¹⁸_{Apr., '95} for the removal of polypi, and, in fact, all operations requiring the cautery snare, praises the platinum-and-iridium wire. Cautery has not lost, in his opinion, the supremacy which it once held over the cold snare; he objects, however, to the frequent applications made by some operators. The use of trichloracetic acid after the applications is insisted upon to lessen the inflammatory reaction.

Cysts and Cystic Polypi.

D. Bryson Delavan, of New York, ¹¹_{June, '96} reports three cases of cystic polypi of the nasal cavity, presenting, as interesting points, the early stage at which they appeared and the persistency with which they recurred. The author condemns the unnecessary severity of the surgical operations sometimes undertaken for their

relief, and sustains his point by showing the facility with which they were removed through the natural passages.

[The possibility of removing even larger growths through the nostrils was illustrated in a case of my own, in which a cystic polypus the size of a large hen's egg was withdrawn by means of the cold-wire snare. To resort to the bloody procedures, such as Rouge's, Langenbeck's, and Ollier's, nowadays, as is frequently the case, especially on the Continent, seems unwarranted in the majority of instances.—C. E. S.]

William Robertson, of Newcastle, ⁶_{Nov. 8, '95} refers to a case that he has had under observation for more than two years, in which there had been a symmetrical development of the affection,—one tumor under each ala nasi. Milligan ¹¹_{Dec., '94} describes a case in which a sero-mucous cyst was located under the ala of the left nostril. An incision one inch long was made under chloroform at the junction of the cheek and gum of the left side and the parts carefully dissected up. In this way the cyst was readily exposed. Unfortunately, during the course of the dissection, the wall was ruptured and the contents, consisting of muco-purulent fluid, escaped. The cyst-wall was dissected away as carefully as possible, the parts well scraped with a small Volkmann spoon, and the cavity packed with iodoform gauze. During the first forty-eight hours considerable inflammatory œdema resulted and the temperature rose to 100° F. (37.8° C.), but this shortly subsided, and in a few days the patient expressed herself as feeling well.

Lupus.

In a case seen by Walker Downie ²¹³_{Dec., '94} several enlarged glands were found in the neck, one of which (undoubtedly tubercular) opened. A brother had undergone several operations at the hands of a hospital surgeon for a tubercular affection in the neighborhood of the hip-joint. The diathetic origin of the lupoid process is thus clearly shown.

Hicquet, of Brussels, ¹¹⁷⁵_{May 15, '95}; ¹²⁶_{Oct. 15, '95} has observed, in women suffering from lupous patches of the skin, 6 cases of tuberculous tumors of the nasal septum. Four of the patients were from 20 to 25 years old and showed an uneven and bosselated tumor on the side of the septum, obstructing the nasal fossa. Treatment was carried out by curetting and zinc chloride; recovery was obtained in two months in 2 of the cases, but in the other 2 the improvement was much slower. In the 2 other cases (women of 55 and 41 years) the bridge of the nose was swollen, and non-ulcerated tumors existed on both sides of the septum, completely obstructing the nasal fossæ. Treatment consisted in incision of

the integument on the dorsum of the nose, with removal of the tuberculous growths and cauterization with silver nitrate. Recurrence occurred, and a recovery was not obtained, notwithstanding fresh cauterizations.

Simonin, of Limoges, ¹³⁶_{Sept. 1, '95} in an article on the pseudopolypoid lupus of the nasal fossæ, concludes that: 1. The pseudopolypoid lupus of the nasal fossæ is a form of tuberculosis that has been incompletely described and is but little known. 2. It occurs more frequently than is thought, and many polypi and pediculated tumors of the septum are but pseudopolypi. 3. Pseudopolypoid lupus is the most attenuated form of virulence which the tubercle bacillus assumes upon the nasal mucous membrane. Though only an hypothesis, this attenuation may be attributed to the presence of zoöglææ in the lupoid nodule,—that is, to bacterial association. 4. Treatment is purely surgical. The lupoid tumor should be treated by the cold- or hot- wire snare, by the curette, and cauterizing. In case of recurrence injections of thymol and guaiacol may be tried, according to the method of Moreau, of Toulouse.

Lake ¹¹_{Feb., '95} has seen remarkable improvement in two cases of lupus of the nose treated by thyroid extract. One of the cases, a boy 11 years of age, had suffered for fourteen months, the soft palate and posterior pillars of the fauces being involved. He had been taking $7\frac{1}{2}$ grains (0.5 gramme) of thyroid extract daily since July 14th and was very much improved.

Dundas Grant, of London, ¹¹_{Dec., '94} reports a case of cured lupus of the nose and palate. The diseased tissues were scraped away from the interior of the nose and from the palate, and the galvano-cautery was freely used in both situations. The patient was then provided with a weak cocaine lotion, and a 20-per-cent. solution of lactic acid for application to the palate at home. In the nose the patient made a similar use of an ointment containing 20 grains (1.3 grammes) of salicylic acid in the ounce, and took small doses of liquor arsenicalis with compound syrup of the phosphates. Under this treatment the disease entirely disappeared, and has not since recurred.

Goris, of Brussels, ¹¹_{Nov., '95} relates several cases in which extensive and total extirpation led to complete recovery.

Tuberculosis of the Nose.

O. Chiari, of Vienna, ¹³⁶_{May 1, '95} states that up to the present time but 21 cases of tuberculous tumors have been described in detail. Bacilli were found in 11 cases; in 6 cases the diagnosis was based on the histological examination only, and in 4 from the clinical

aspect only. The scarcity of the number of observations since 1878 shows, at least, the rarity of the affection. In 6 cases infection must have come from the outside. Schaeffer had already noted that the first infection affects the cartilaginous septum; then in 12 cases the cartilaginous septum alone was affected; in 6 others neighboring parts of the nose were likewise affected. Finally, in the author's sixth case the tumor was seated upon the bony septum. In 18 cases, consequently, infection took place on the cartilaginous septum, and generally at its anterior part, where excoriations are so frequent and where the finger-nail may easily introduce the bacilli. Notwithstanding the great tendency to local recurrence, the prognosis as regards life seems good. Of the 21 cases general tuberculosis occurred but four times and in three of these it already existed when the nasal tumor was observed.

Orlandi ⁹⁹⁷_{v.45,p.48,'96} reports the case of a young man of 20 years, with no hereditary history, who entered the hospital with symptoms of meningitis, which was supposed to be of the basilar form, probably of tuberculous origin. At the post-mortem examination the meninges were found to be adherent; the right frontal lobe was softened; miliary granulations were found along the Sylvian fissure. An abscess of the size of an egg was found in the depth of the frontal lobe, showing greenish, cream-like pus. There was caries of the lamina cribrosa and of the ethmoid bone; the probe passed into the nasal fossæ, where the mucous membrane was found to be swollen, with deep ulcerations. There were no lesions of the other viscera. Injection of the pus into guinea-pigs and bacteriological examination demonstrated the tuberculous nature of the lesion, whose origin was tuberculosis of the upper portion of the nasal cavities.

William Hill ¹⁰⁷⁷_{Apr.3,'96} reports a case of ulcerative disease of the left nasal fossa of undoubted tubercular nature, followed by lupoid disease of the left also. H. Neumayer ¹¹⁵¹_{B.2,H.2,'94} reports a case of tuberculosis of the mouth, maxillary sinus, and nose. Broeckaert reports ⁶⁸⁰_{v.4,p.230,'94} two cases of nasal tuberculosis and Pluder one case. C. Symonds, of London, ²²_{Oct.23,'96} a case in a man, aged 48, who was invalided out of the army for consumption and whose father died of phthisis, while his mother has it now. No definite physical signs could be discerned.

[Judging by the number of cases reported, it is evident that nasal tuberculosis is by no means as rare as was formerly supposed. —C. E. S.]

Syphilitic Rhinitis.

Garel, of Lyons, ¹³⁶_{July 15,'96} presents two interesting cases of primary chancre of the nasal septum. The first case was that of a

male of 22 years, who showed an elliptical ulceration on the inferior part of the right side of the septum. The centre of the ulcer was depressed, but the edges were not raised above the level of the mucosa, and the bottom was covered with a brownish crust. The mucosa itself was inflamed and puffy. Both tonsils were covered with mucous plaques and one sub-maxillary gland was enlarged on the same side as the nasal lesion. The trunk was covered with diffuse macular syphilides. Syphilis was denied by the patient, who complained from nasal obstruction and had been in the habit of picking his nose. The second was that of a male of 33 years, who also denied syphilis, and who complained of nasal obstruction on left side, with thick, yellow discharge and persistent headache, which symptoms only dated back eight days. The septum showed a whitish ulceration surrounded by a reddish zone. The wife of this patient was syphilitic and probably infected by the husband. In both instances it was impossible to determine the source of the syphilitic virus. The details of the second observation tend to prove that the nasal lesion was a primary chancre of the nasal mucous membrane. The patient had had no lesion on the penis and the secondary accidents had shown themselves in their customary sequence. Finally, the patient's wife was infected by her husband, since she suffered from a primary lesion after the secondary lesions of her husband. Consequently, it is impossible to maintain the hypothesis that she was the original cause of the infection. It is impossible to decide how the husband himself was infected, but the uncommon location of the chancre would suggest that a rare form of infection was in question. Garel is inclined to believe that the patient must have infected himself with the finger-nail covered with virulent specific substance.

Arslan¹¹_{July, '95} also reports a case of chancre of the right nasal fossa. The patient was a woman, 30 years of age, whose right nasal fossa was occupied by a white and yellow mass, situated upon the superior half of the quadrangular cartilage. The patient was cured by specific treatment.

Fibroma.

Réthi, of Vienna,⁸_{Apr. 25, '95}³⁷_{July} reports a case with a hard fibroma springing from the middle meatus by a long, soft pedicle, penetrating a considerable distance into the naso-pharyngeal cavity and obstructing the latter almost completely. The patient, 25 years old, complained chiefly of nasal obstruction and of intermittent frontal cephalalgia. In order to remove the tumor in one piece, and also on account of the great sensitiveness of the pharynx not-

withstanding the use of cocaine, Réthi performed its ablation by the anterior cavities with the cold-wire snare. The tumor measured 9.5 centimetres in length and 9 centimetres at its greatest circumference.

Price Brown, of Toronto, ³⁹_{Aug. '90} reports a case of recurrent nasal fibroma in an hæmophilic. The case is of considerable interest as an indication of what may be expected when hæmophilia occurs as a complication. The patient consulted a specialist, who snared off a portion of the growth. This produced profuse hæmorrhage, which, however, soon ceased. As the tumor seemed to grow almost as rapidly as it was snared away, a microscopical examination was made and the disease found to be sarcoma. On further consultation with general surgeons it was advised that a portion of the right maxilla be removed and a silver plate inserted, the case being considered one of malignant disease. This, however, his family declined to consent to, and he was sent to Boston and had several operations performed under ether. They were all intranasal, attended by exhausting hæmorrhages, and the nostril, after each operation, was tightly tamponed.

About four years later the growth had returned. About an inch and a quarter from the nostril the passage was completely filled by a bright-reddish growth, springing from the septum, the vault above, and the middle turbinated. The attachment on the septal side extended down to the bottom of the inferior meatus. Posteriorly the tumor filled the whole of the nasal cavity. Price Brown thought of electrolysis, but, having had no personal experience of its effects in deep nasal work, he finally endeavored to remove the growth, little by little, with the galvano-cautery knife. After two sessions he made a third attempt at galvano-cautery, incising the central portion between the other two cuts. The electrode was of a bright-red heat, and it had only been applied a few seconds when arterial blood commenced to flow with great rapidity. He packed the cavity from behind with Belloq's cannula, having first soaked the sponges with a combination of tannic and sulphuric acids. This effectually stopped the bleeding, but the patient was almost pulseless by the time it was accomplished, and two hours later, when being assisted to a carriage, fainted.

Price Brown then tried electrolysis. After applying a 20-per-cent. solution of cocaine long needles were inserted through the anterior naris into the growth at a distance of about half an inch from each other. These were attached to a twelve-cell Leclanché battery. The *séances* were about five minutes each and given on alternate days. Notwithstanding the anæsthetic effect of the

cocaine, the application was very painful,—more so than that of galvano-cautery,—but the shrinkage produced by four sessions was almost *nil*. The author again returned to the use of the galvano-cautery.

From January 18th to March 15th he operated with it at sixteen different sittings, each time applying the cautery as extensively as he thought he could do with safety. Sometimes there was no hæmorrhage; at others it was only slight; never severe enough to require plugging. Little by little the growth was destroyed. The first half of the operations were performed entirely through the anterior naris. The latter half also were done through the anterior naris, while the operations were guided by the use of the posterior rhinal mirror.

To complete the work, as the pharyngeal tonsil was somewhat protuberant he removed it with Gottstein's curettes as a precautionary measure. The bleeding from the cuts was severe, but was checked without plugging. One notable feature in the history of the treatment was the extent to which the palate resumed its natural functions.

Price Brown considers this a case of recurrent nasal fibroma, believing that the original attack, from which the present one must have developed, was really fibroma instead of sarcoma. At the time of writing there was no indication of any tendency to return.

[Price Brown deserves great credit for his persistent efforts, for considerable courage is required under such circumstances. While hæmophilia is mainly due to a diseased state of the arterial coats, the administration, several days before operative procedures are to be resorted to, of strychnia to stimulate the vaso-constrictors and ergot to encourage coagulation may greatly contribute to avert untoward results.—C. E. S.]

Lipoma.

Gomperz ³⁸⁵_{B. 28, p. 280, '94} reports the case of a stout man of 69, who presented a tumor the size of a small cherry in the upper portion of the nasal cavity where the triangular cartilage meets the nasal bone. It was round and covered with apparently glandular mucous membrane. The color was pale red; surface ulcerated in spots and covered with blood-crusts; it had a broad base. The general state of the nasal mucosa was that of atrophic rhinitis. Epistaxis was frequent. The mass was partly removed with the galvanic snare and partly with the curette. By microscopical examination it was determined to be a lipoma. The author states that this is the first case of its kind on record, as far as situation is concerned.

Malignant Growths.

In a study of the primary sarcomata of the nasal fossæ F. Helme¹⁷_{Feb.23,'96} states that, even if sarcomata of the nasal fossæ are submitted to the same laws of structure and development as the other sarcomata of the system, they may be distinguished by their evolution, by the difficulty of their removal, and finally by the serious dangers due to infection and hæmorrhage to which such patients are liable.

Jonathan Wright, of Brooklyn,⁵⁰_{Apr.20,'96} reports a case of osteo-sarcoma in the nose of an ox, of probable traumatic origin. Thomas J. Harris¹¹_{Sept.,'96} records a sarcoma in which there was absolute occlusion of the left nasal fossa, the tumor protruding below. After an attempt was made to snare the growth under cocaine, ether anæsthesia was induced and Boeckel's operation performed. The growth was found to be attached to the ethmoid, and its manipulation gave rise to profuse hæmorrhage, so much so that it was thought the man would die on the table. It was shelled out with the finger as rapidly as possible and proved to be about as large as a good-sized hen's egg. The cavity was then packed with iodoform gauze. The patient made a good recovery and left the hospital at the end of ten days. The pathologist reported that the growth was a small round-celled sarcoma. The operation was done in July, 1894, and up to the time of report there were no signs of a recurrence. Norval H. Pierce, of Chicago,¹⁰⁵²_{July,'96} reports a case of sarcoma of the nose unsuccessfully treated with the toxins of erysipelas and bacillus prodigiosus.

M. D. Lederman, of New York,⁵⁹_{Nov.30,'96} records a case of sarcoma of the nasal cavity in which he performed ligation of both external carotids and obtained very satisfactory results as regards the progress of the growth. The latter had not been removed at the time the article was written, but it seemed less vascular and stood contact with the probe without bleeding.

Rhinoscleroma.

In a case of rhinoscleroma seen by Péan⁹⁹⁶_{Nov.10,'96} the lower two-thirds of the nose were involved in a sclerotic process extending to the upper lip and narrowing the opening of the nostrils, and which subsequently extended to the maxillary and ethmoidal sinuses. The operation consisted in removing a portion of the upper lip, the nose, turbinated bodies, and ethmoidal and maxillary sinuses. This large wound granulated normally, and the mucous membrane was gradually reconstituted. From time to time, however, some recurring spots, which had shown themselves on the new mucous membrane, had to be destroyed with

Canquoin's paste, but cicatrization was finally complete. An ingenious apparatus furnished adequate support, and the patient is now completely cured.

Cases of rhinoscleroma are also reported by W. Weil⁵⁷_{Nov. 11, '94}; P. J. Pick, of Prague⁸_{No. 17, '95}; Kayser, of Breslau⁴²_{July, '95}; P. Scifosowski, of Moscow⁵³⁰_{No. 19, '94}; Schloffer, of Graz,⁸_{No. 31, '94} and Srebrny.¹¹⁵¹_{B. 2, H. 2, '94}

Synechiæ, Synostoses, Occlusion, etc.

Bonain, of Brest,¹³⁶_{No. 5, '95} reports a case of bony synechia and myxoma of the right nasal fossæ in a man of 19 years. The right cavity was completely occluded; the left nasal was very narrow, being partly obstructed by a deviation of the septum; respiration was greatly impeded. After removing the polypi a vertical osseous septum presenting a small opening at its lower portion was found and gradually enlarged polypi. This was penetrated with the gouge, the result being very satisfactory.

In a case reported by J. R. Winslow⁸¹⁴_{Feb. 15, '95} the bony occlusion was destroyed by galvano-cautery, curing deafness which had been present for some time.

Thrasher⁹_{July 20, '95} reported to the American Laryngological Association the history of a case of congenital osseous stenosis of the naris. In the discussion, Langmaid, of Boston, also alluded to three cases.

NASAL SEPTUM.

Abscess.

A. Kuchner,¹¹⁵¹_{B. 2, H. 1} in a paper on acute perichondritis of the nasal septum, reports three cases in which the septum was the primary seat of an acute lesion with fibrile disturbances; there was no history of traumatism or of local infection. The febrile manifestations of the onset ceased as soon as the pus could be freely drained. In all the cases redness and swelling of the dorsum of the nose and of the neighboring parts existed; these symptoms were considered as due to stasis; they ceased as soon as the abscess was opened.

Malignant Growths of the Septum.

Sikkel, of Utrecht,¹¹_{June, '95} describes a case of carcinomatous lymphoma in a woman, aged 46 years, who had long suffered from headache, nasal obstruction, and epistaxis. The left nostril was completely filled by a pinkish-red, mulberry-like mass located on the septum. The right nostril also presented on the septum a small, sharply-circumscribed growth. A fragment was removed from the left side, and typical epithelial cells, with many lymph-

cells, were found, which gave the growth a mixed character. The growth was removed by means of the galvano-cautery snare. Wodon ¹³⁶_{Aug. 1, '95} reports a case of sarcolymphadenoid tumor developed on the lobule of the nose.

Strazza ⁶²⁴_{No. 3, '95} reports the case of a young man of 17 in whom an extensive ulcerative tumor on the anterior portion of the septum very closely simulated tuberculous perichondritis. Microscopical examination alone revealed its true nature,—epithelioma. The growth was removed, but three months later recurrence occurred in the skin over the dorsum.

Bleeding Polypus; Angioma.

Réthi, of Vienna, ¹¹³_{Nov. 11, '94} reports a case of bleeding polypus of the septum in a woman aged 25 years. Obstruction of the right nostril, accompanied by frequent hæmorrhage, had been present for a year. Réthi considers this form as analogous to the polypoid enlargement frequently met with over the middle turbinated bone. He believes that these tumors, like the polypoid hypertrophies of other regions, are due to a chronic catarrhal process, and that their etiology and histology do not warrant a special position for them in rhinological nosology.

Arthur Alexander, of Berlin, ¹¹⁵¹_{B.J.H. 3, '94} examined specimens taken from three cases and found a connective-tissue stroma the meshes of which contained round cells and varicose veins. Glands were discovered in but one preparation, and then only in the deeper layers. The first tumor, owing to the quantity of round cells present, resembled a granuloma; in the second the blood-vessels were more abundant, while in the third connective tissue was the predominating element. This class of growths may in reality present an histological picture varying from that of a simple granuloma to that of a soft fibroma. Bleeding does not appear to be a characteristic, since in one case there was no hæmorrhage.

W. Freudenthal, of New York, ¹¹_{May, '95} reports the case of a woman, 22 years old, who, of a traumatism about nine months before, began to bleed at the nose, nasal respiration being also obstructed. The bleeding continued, but she did not seek medical advice until six months later, when a flat tumor on the front part of the nasal septum, about double the size of a cherry, was found. An attempt made to remove it produced free hæmorrhage. The patient was then sent to the hospital and the growth removed completely. The hæmorrhages continued, however, the patient bleeding several times daily. Under the microscope the growth proved to be an angioma.

Tumors of the Septum.

Y. Arslan, of Padua, ¹¹⁰⁵_{Feb., '96} in all medical literature has found but 131 cases of tumor of the septum, 10 of which were syphilitic and 25 tuberculous. Among new growths, properly speaking, sarcoma is the most frequent, amounting to more than 36 per cent. of the cases; then come fibromata in the proportion of 28 per cent. The female sex shows a greater predisposition to the development of these tumors, especially of sarcomata. They are usually located on the cartilaginous septum, probably because it is the most exposed. Benign tumors of this region seem more disposed than tumors of other organs to become transformed *in situ* into malignant tumors. Arslan adds 4 of his own,—2 cases of fibrosarcoma, 1 of adenofibroma, and 1 of simple inflammatory granuloma.

Papilloma.

Ripault, of Paris, ³⁷_{Nov., '95} reports a case of confluent papilloma of the nasal fossa in a man, 36 years of age, who came to Gouguenheim's clinic. The affection had begun about four years before by a small pimple just within the nostril; this was scratched by the patient several times, and it was consequent upon these repeated excoriations that the tumor developed. On direct inspection the nostril was found to be completely obstructed by a solid, gray-rose, bosselated mass, which was firm in consistency and bled easily on contact of the probe. The latter could easily be passed into the growth, which resembled a raspberry, being formed of a large number of isolated lobes. Some of the latter—the greater number—spring from the septum, others from the floor of the nasal cavity and from the surface of the internal teguments of the ala nasi. The tumor was easily removed with the curette, bleeding rather freely. The tumor was inserted around the nasal aperture to a depth of about two centimetres; it involved the anterior extremity of the inferior turbinated body, which, in other respects, was entirely normal. The great amount of surface involved precluded the use of the actual cautery.

Weil ³⁷_{Oct., '95} reports a case of papilloma of the septum the size of a small nut and bright red in color. It was attached by a pedicle, almost two millimetres thick, to the antero-superior portion of the septum, almost at the limit of the mucous membrane. It nearly filled the entire right nasal fossa and was extracted with hardly any hæmorrhage. It proved to be a true papilloma (not to be confounded with the papillomata of the inferior turbinated bodies described by Hopmann and others) of extraordinary dimension. The author states that Mackenzie has seen but five

such papillomata reaching the size of half a pea, and four of them were combined with mucous polypi. Of 3300 patients, of whom 1500 suffered from tumors, Schmidt met with but 6 cases, and Zuckerkandl has observed but 1 case of true papilloma of the inferior turbinate.

Jonathan Wright, of New York, ¹_{Dec. 26, '95} in reporting a case of papilloma, calls attention to the confusion in nomenclature introduced by Hopmann, who called "papillomatous hypertrophies" and "papillomatous fibromata" by the one name of "papilloma." Differing, as they do, in pathogenesis, structure, and usual situation, and having only in common occasionally the same appearances to the naked eye, there is no excuse for the term, which has, unfortunately, been adopted by the majority of authors.

Emil Mayer, of New York, ¹_{Dec. 14, '95} in a case of deviation of the cartilaginous plate, incised the convex side of the deviation horizontally and perpendicularly, and, after straightening the septum, introduced a vulcanite tube shaped like an old-fashioned powder-flask, which shape the author found to more accurately adjust itself to the parts. A permanent result was thus obtained, notwithstanding the marked deviation.

G. Spiess, of Frankfort-on-the-Main, ¹¹⁵¹_{B. 1, H. 3, '94} has reached the conclusion that, of all the measures yet proposed for the treatment of deviations of the nasal septum, that involving the use of small burrs and trephines, such as are used in America, is the best. The advantages of this method are numerous,—it is possible to operate in most cases without causing the slightest pain, the operation lasts but a few seconds, the use of the instruments is exceedingly easy, and the technique is soon learned.

Kretschmann, of Magdeburg, ¹³⁶_{Dec. 15, '95} has for some time used a trephining apparatus employed by Moritz Schmidt in his polyclinic and described by Spiess. ¹¹⁵¹_{v. 1, p. 282} Kretschmann is so well satisfied with the instrument that he no longer has recourse to straight saws. The results obtained in twenty-five cases confirm the advantages of this method, as pointed out by Spiess.

Epistaxis.

Thomas Hubbard, of Toledo, Ohio, ⁵⁹_{Apr. 20, '95} relates a curious case in which the fear of recurrence of epistaxis seemed to be the sole cause of death in a pregnant woman. The patient was still in the puerperal state, and Hubbard expresses the opinion that mental shock induced fever; the uterine and vaginal, together with the already atrophic and unhealthy nasal, mucous membranes were thus the source of sapræmia, which condition in turn increased the fever, and the latter gradually merged into a fatal toxæmia.

C. Seiler, of Philadelphia,¹⁹⁶_{Oct., '96} in reporting an interesting case of epistaxis, states that he has always found that the spot from which the hæmorrhage came was situated on the septum about midway between the anterior and posterior margin of the cartilaginous plate, and also that the bleeding was caused by granulation-tissue, which very quickly forms to cover any abrasion of the mucous membrane in that locality. Such granulations he removed with the finger-nail until all sponginess to the touch had disappeared.

Marmaduke Sheild,¹⁰⁷⁷_{July 31, '96} recommends the following as the best treatment of epistaxis in dangerous and obstinate cases: The patient should always sit up before an open window,—never lie down,—so as to keep the head higher than the trunk. Ice may be used locally and to the back of the neck. The lower extremities should be immersed in hot water up to the knees, or the lower limbs bound with hot cloths, and small doses of digitalis with ergot may be given every three hours.

[The importance of the upright position in these cases is frequently overlooked. Gravity plays its part here as well as elsewhere, and the mere change from the recumbent to the sitting posture is frequently sufficient to arrest the flow of blood.—C. E. S.]

Maizonda,¹⁴_{June 30, '95} in a case of severe epistaxis against which all forms of treatment were unsuccessful, tried refrigeration by spraying ether into the nose with a Richardson atomizer. The epistaxis ceased at once. The author believes that this method is destined to rank among the first in the treatment of serious epistaxis.

Lermoyez, of Paris,¹⁹_{Apr. 6, '95} in slight cases of nose-bleed, advises compressing the nose between the thumb and forefinger for ten minutes; if that be insufficient, a tampon may be applied, moistened with a 10-per-cent. solution of antipyrin, which is an excellent hæmostatic. In more severe cases a nasal speculum may be introduced and the anterior portion of the nose tamponed with fine strips of iodoform gauze four inches in length and one in breadth, introduced with fine forceps. As the hæmorrhages nearly always arise from the anterior portion of the nasal cavity, there is no necessity of tamponing far back.

J. W. Thomason, of Arkabutla, Miss.,¹⁸⁶_{Sept., '96} recommends the use of a clean silk condom, introduced with a small probe, shaped so as to correspond with the nasal cavity, after oiling it well with oil or vaselin. After withdrawing the probe the mouth is applied to the open end of the air-bag and the latter is fully inflated. A thread is then tied around the open end,

thereby securing the air. The pressure on the bleeding-spot arrests the flow.

E. L. Vansant, of Philadelphia, ¹¹⁹_{Feb. 2, '96} in discussing habitual epistaxis, states that a loose plug of absorbent cotton saturated with full-strength official solution of hydrogen dioxide inserted into the bleeding cavity, supplemented by firm compression of the nose with the fingers, is an effectual means.

Herman L. Armstrong, of Brooklyn, ¹_{Nov. 16, '96} asserts that in the treatment of epistaxis there is probably no remedy that will give such general satisfaction as hot water. It is a good plan to start by using the water lukewarm, injected with a syringe through the nostril upward and backward, allowing it to escape from the opposite nostril into an ordinary pus-basin, and gradually increasing the heat of the water until it is made as hot as can be borne by the patient. The author recommends a syringe with an adjustable shield that makes the work of syringing the nose free from the danger of the water and secretion discharging from the opposite nostril going entirely over the basin, either upon the patient's or physician's clothing or carpet.

Galetti ¹¹⁵³_{Oct. 12, '96} remarks that, although the auricular complications due to posterior tamponing of the nasal fossæ have led to the condemnation of this method of treating epistaxis, certain physicians find it difficult to give it up. He has recently collected the histories of four cases in which acute otitis media developed on the third or fourth day after posterior tamponing had been practiced. The small blood-vessels must be exposed and a drop of chromic acid or of nitrate of silver applied to them. Or a condom may be introduced empty into the nasal fossa and afterward filled with air. Galetti considers oxygenated water as a valuable styptic.

NEUROSES.

Anosmia.

Joal, of Mont-Dore, ⁶_{May 18, '96} had recently under his care two cases of anosmia, in both of which all sense of smell and taste had disappeared for several months and had been unsuccessfully treated by irrigation, the galvano-cautery, electricity, and insufflations with a powder containing strychnine. The two lost senses were completely restored by the employment of douches of CO₂ gas. The *modus operandi* is most simple. An ordinary seltzer-siphon is turned upside down, the excess of liquid is allowed to escape through the tap, and the orifice is then held close to the nostrils.

Marcel Lermoyez, of Paris, ¹¹⁵³_{July 6, '96} recommends stimulating the olfactory mucous membrane by giving the following powder:—

R Neutral strychnia sulphate,	0.10 gramme (1 $\frac{3}{4}$ grains).
Powdered iris,	0.50 gramme (8 grains).
Powdered sugar of milk,	10.00 grammes (2 $\frac{1}{2}$ drachms).

M. Sig : To be used as a snuff twice a day.

For the local application of electricity he employs a carbon plate-electrode four centimetres in diameter, which he places at the root of the nose, the other metallic electrode—no larger in diameter than a pea—is covered with absorbent cotton and introduced as high up as possible into each of the nasal fossæ. The treatment is applied every other day for twenty minutes (ten minutes in each nostril), the galvanic current, with a maximum intensity of 3 milliampères, being used five minutes on each side, and the faradic current an equal length of time. In the latter case a large wire is used, the current, just strong enough to be perceived, being interrupted at first slowly, then rapidly.

Parosmia.

Herbert Tilley, of London, ⁶_{Oct. 12, '96} records three cases, the main features of which were the intensity of the unpleasant sensation and the absence in the nasal cavities of any visible pathological lesion. The first was undoubtedly a post-influenzal neurosis, and similar cases have hitherto been described. Tilley prescribed nerve-tonics for the patient for a fortnight, but without any result, and then ordered him to use a solution of strychnia (10 minims to 1 drachm—0.65 gramme to 4 grammes—daily) as an intra-nasal spray. This proved permanently efficient in the course of a week. The result of treatment would seem to point to the distribution of the olfactory nerves as the seat of the lesion rather than the olfactory bulb or a higher centre. The origin in the second case was obscure and the treatment less satisfactory than in either of the other cases. The last was undoubtedly a climacteric neurosis and resembled the various pharyngeal and laryngeal paræsthesiæ so commonly observed in females at this time of life. That such was the case was evident from the manner in which the symptom diminished and practically disappeared under treatment directed to the general condition of the patient. The importance of recognizing such cases is considerable when the possibilities of unnecessary local treatment are borne in mind.

According to Marcel Lermoyez, of Paris, ¹¹⁵³_{July 6, '96} parosmia is of great interest to the physician, since it becomes an obsession, a veritable torture, often leading to hypochondriasis in the patient suffering from it, and at times giving rise to obstinate anorexia, which affects the health. Cacosmia is often accompanied by anosmia, and frequently it is the precursor of the latter.

[The fact that parosmia occasionally occurs as a complication of the various inflammatory disorders of the Schneiderian membrane should not be overlooked. Proper local treatment of these conditions frequently yields satisfactory results without the employment of measures to combat the parosmia *per se*.—C. E. S.]

Reflex Neuroses.

Epilepsy.—Siethoff¹³⁶ reports two cases of reflex epilepsy of nasal origin. In one of the cases the paroxysms were accompanied by the sensation of a very fetid odor, persisting for eight days. Both cases showed marked hypertrophy of the turbinals, the reduction of which by means of galvano-cautery completely overcame all the untoward symptoms, including the epilepsy.

Adenot²¹¹ relates a case in which a nasal osteoma caused epileptic seizures. The growth was removed under anæsthesia by vertical osteotomy of the nose (Ollier's method). There was abolition of the epileptiform crises for a month, when they reappeared, but not so frequently and not so intense as before the operation.

Neuralgia.—Edmund L. Spear⁹⁹ reports a case markedly illustrating the nasal origin of many trigeminal neuralgias. The most radical measures had been unsuccessfully employed, including removal of the roots of the fifth pair. Local treatment of the nose caused a final recovery.

Mayo Collier² reports a case of nasal disease causing severe neuralgia of four or five years' standing. The anterior nares were occluded, but the probe detected dead bone. The author removed a polypus and afterward some necrosed bone covered with granulations. The patient made a good recovery. The same writer⁶ describes two additional cases of severe trigeminal neuralgia due to nasal disease. In the first case the removal of teeth and the exhibition of medicines and galvanism failing, an operation on the infra-orbital nerve was about to be performed just previous to his being consulted. Examination revealed extensive disease of the middle turbinated bone on the same side as the neuralgia. He at once removed with the cold snare the greater portion of the diseased structures. From that time the neuralgia practically ceased, and, with the exception of a few slight relapses due to the accidents incidental to the healing process in the nose, the woman has been completely relieved. The second case was of a similar nature.

Headache.—James E. Nichols⁵⁹ in a paper read before the Medical Society of the County of New York, on some intra-nasal causes of headache, asserts, from observation of a number of cases,

that headaches are more frequently of nasal origin than is generally suspected; that they are, in the main, of congestive variety, and due to interference with the circulation of the dura mater by pressure at some point in the nasal cavity or accessory sinuses, induced by retained secretions and by hypertrophies of the membrane or abnormalities of osseous structure. The pressure is generally on some branch of the ophthalmic vein. Abnormal conditions in the inferior meatus induce free pains, but not cephalalgia. Headaches in which the area of intensity is about the orbit are most apt to be due to disease of the ethmoid cells and antrum. Successive attacks of a similar nature are, in his opinion, generally of nasal origin.

Eye.—Ernst Winckler ⁷⁶⁰_{Nov. 20, '95} states that the result of his investigations shows that, in 164 children with diseased eyes, 67, or about 40 per cent. of them, had affections of the upper air-passages and especially of the nose. The importance of bearing this class of affections in mind in this connection is illustrated by E. Stangenberg, of Stockholm, ⁴²_{July, '95} who examined 2344 children in four schools in Stockholm, and found that of these 260 (11.09 per cent.) suffered from diffuse rhinitis, 72 (3.07 per cent.) from atrophic rhinitis, 173 (7.38 per cent.) from hypertrophic pharyngeal tonsils, 65 (2.77 per cent.) from adenoid vegetations, 66 (2.81 per cent.) from diffuse pharyngitis, 31 (1.32 per cent.) from dry pharyngitis, 1178 (50.25 per cent.) from granular pharyngitis, and 351 (14.98 per cent.) from hypertrophy of the tonsils. Fage, of Amiens, ¹³⁹_{July, '95} in discussing the subject of iritis of nasal origin, states that, since Ziem had shown the relation existing between nasal affections and certain irites, he had not seen a case recorded, in which ozæna had caused the disease, until recently, and concludes that these lesions must be attributed to infection by the microbe of ozæna, which is capable of producing infection at a distance, provided it gains access to the blood-vessels or lymph-glands. Georges Laurent, of Paris, ¹⁰⁰_{Sept. 7, '95} publishes an excellent review of the relations of diseases of the nose and its accessory cavities to diseases of the eye.

Ear.—H. Macnaughton Jones, of London, ²²_{Oct. 16, '95} ⁶⁷³_{Nov., '95} in a paper on turbinal hypertrophy in relation to deafness, with especial reference to the operation of turbinotomy, advances the following conclusions: 1. Turbinal hypertrophy must be regarded as a serious complication of deafness and the allied aural disorders; in those cases in which it precedes the aural symptoms it may justly be looked upon as a principal cause of these. 2. In all cases in which the hypertrophic change is discovered active therapeutic measures—of which the chief is the galvano-cautery—should be

adopted to reduce it. 3. Deviation or distortion of or growths from the septum are rarely, if ever, causes of deafness, and only become such when they complicate turbinal hypertrophy. 4. In all cases in which the occlusion of a nostril is found to be in part due to septal deviation or growth, this deviation should be rectified. 5. Turbinotomy is indicated in and should be reserved for those cases in which, either from the size or nature of the growth, it is useless to hope for improvement from other treatment. This can occur in but relatively a very small proportion of aural cases. J. A. Thompson, of Cincinnati, ²³³_{June 11, '95} asserts that in 95 per cent. of all cases of deafness from disease of the middle ear the primary disease is in the nose or throat.

Gradle, of Chicago, ⁵⁶⁸_{Aug., '95} from observations on the same subject, concludes that neither acute nor chronic purulent otitis is influenced by nasal treatment, but that the liability to relapse after its cure is decidedly lessened by the removal of naso-pharyngeal anomalies. Acute catarrh of the middle ear will generally terminate in complete recovery under aural treatment, and sometimes even without it, provided there are no persistent nasal or pharyngeal lesions; but when these are present the disease is more likely to become chronic in spite of aural treatment, and in many instances can either not be cured or, if improved, will speedily relapse unless the normal state of the nose and throat is restored. Proliferation or adhesive disease of the middle ear is the consequence of retronasal catarrh, and its course is determined by the duration of the disorder causing it. Aural treatment alone is practically useless in this form of trouble, while nasal treatment, if successful as far as the catarrh is concerned, will also arrest the ear disease. The restitution of hearing, however, depends on the length of time the disease has lasted, and is often aided by ear treatment after the cure of the retronasal catarrh.

Cough.—Jouroukschi, ³¹_{Dec. 19, '94} reports a case of rhythmical reflex cough of nasal origin. The patient presented in the naso-pharyngeal isthmus a tumor two centimetres long by one centimetre wide, covering the posterior border of the vomer. This tumor was a lymphadenoma. After its extirpation the attacks of coughing completely disappeared.

A. Brindel, of Bordeaux, ¹³⁶_{Jan., '95} reports a case in which a tooth was found growing in the floor of the right nasal fossa, giving rise to attacks of coughing and of laryngeal spasm. Recovery followed its removal.

Melancholia.—F. H. Bosworth, of New York, ⁴⁵¹_{Aug., '95} reports a case of melancholia cured by intra-nasal operation. The patient, a man aged 42 years, suffered from depressive melancholia, at first

periodical, but later constant; had at different times been operated on for varicocele, stricture, ligation of the pudic artery, removal of the testicles, and hæmorrhoids; had worn glasses; had his eye-muscles cut and one eye enucleated, etc. Examination of the nose showed the right nostril nearly occluded by a thickened bulging of the cartilaginous septum and the left middle turbinate thickened, with myxomatous degeneration, and evidences of ethmoid disease. The nostrils were freed with saw and snare and all symptoms quickly disappeared. The man has since remained perfectly well.

Hay Fever.

Morton Prince, of Boston, ²³_{June, '95} observed hay fever, due to nervous influences, in five members of the same family, and considers this as a proof of the neurotic origin of the affection. The author suggests that mimicry must play an important part in originating the autosuggestion in each of these cases, and that a large number—one cannot generalize too extensively and say all—of the cases of recurrent periodical hay fever might possibly develop in the same way. The attacks under this condition would come on on a certain date because of apprehension or expectancy, by which the patient suggests to himself or herself that at that time he or she will be susceptible to external irritants of one kind or another, and then at the suggested time the irritant produces its habitual and expected effect. This seems to him a plausible hypothesis, and the experiment well worth trying, of treating a large number of such hay-fever patients by counter-suggestion and recording the results.

[The fact that the initial attack and the two or three succeeding ones are usually considered by the patient as severe "colds" would tend to demonstrate that autosuggestion cannot play the slightest part in at least the early history of a given case. Later on, however, when the identity of the disease has become fully established, and dread, rendered acute by the knowledge that at a precise hour on a fixed day the suffering is to begin, can but exercise a certain influence upon the sufferer and contribute its share toward the elaboration of an attack at the expected time. That apprehension or expectancy may alone suffice to bring on an attack by autosuggestion is negatived by the fact that cases sent to hay-fever resorts are not all benefited, notwithstanding absolute faith in the immunity to be obtained; while other cases are often surprised, during a voyage, to find themselves well during the entire period looked forward to with intense apprehension, merely because they happen to be in a district in which

one of the elements of the affection—the peculiar irritants to which the patients are susceptible—are absent.—C. E. S.]

Joal, of Mont-Dore ¹³⁶_{Apr. 1, 1896} concludes that the majority of sufferers present evidences of lowered nutrition and neurasthenia, vasomotor disturbances of the nasal mucosa leading to the paroxysmal outbreaks, which can appear independently of any hypertrophic change. There ordinarily exists, however, an hyperexcitability of the nasal lining. Among the irritating elements, a preponderating activity must be assigned to odors. Next in importance are luminous impressions. Heat and dust may cause a general cutaneous irritation or may act mechanically upon the nasal mucosa. The specific action of pollen or of certain micro-organisms is not admitted. The disease may occur either in an irregular or periodical manner, the periodical form being probably due to the fact that at certain seasons of the year there is a certain conjunction of odors, light, and heat.

[Three years ago a close study of the question ⁶⁷³_{Sept., '93} led me to conclude that “hay fever” was not a disease in the generally accepted sense of the word, the vasomotor system being but one of the more important systems brought into play. “Hyperæsthetic rhinitis in its active form is but the result of a sudden cessation of the inhibitory functions of the nerve-centres presiding over the physiological processes of the upper respiratory tract. These nerve-centres, under the influence of hereditary or acquired disease of an adynamic type, having themselves become adynamic, are able to carry on their functions under ordinary circumstances; but, when demand is imposed upon them for inordinate functional activity, they lose all power of control and give rise to the symptoms observed after section of the sphenopalatine ganglion or of the cervical sympathetic, as shown by Claude Bernard, most marked of which symptoms is hyperæsthesia. Concurring with and as a result of this central adynamia there exists a liability of the nasal mucous membrane to become unduly influenced by certain irritants, physical or chemical, or a central susceptibility to the emanations of drugs, plants, animals, or other elements. When either of these irritants or emanations are subjected by their nature to the laws of periodicity, hyperæsthetic rhinitis manifests itself periodically. If periodicity does not regulate the appearance of the causative elements, the disorder may present itself at any time of the year, whenever the susceptible individual is exposed to the element or elements to which he may be vulnerable. Habit and psychical impressions, as is usually the case in neurotic disorders of an adynamic type, may play, in an especially sensitive individual, an active part in the production and cessation of the

W. Scott Renner, of Buffalo, ^{Aug., '96} considers paroxysmal sneezing as identical with hay fever, hay asthma, and rose cold, only differing in the active irritant. He likewise notes that cases suffering from hay fever for a long time are very apt to merge into this condition, and suggests the name "rhinitis vasomotoria chronica," in contradistinction to the "rhinitis vasomotoria periodica" as applied to hay fever by Mackenzie. The psychical element has more to do with the production of hay fever than with this disease, says the author, though it is likely that it has more to do with the onset at a particular time and the limitation of hay fever to a certain period than with the actual cause of it. The writer believes that the physical condition is always present, and it needs but the psychical condition to bring on the attack, as evidenced by the fact that the sudden sight of an artificial rose can precipitate an attack at any time in some patients.

R	Liq. potass. arsenitis,		
	Ext. nucis vomicæ fluidi,		
	Ext. cinchonæ fluidi (detannated),	aa	2 drachms (8 grammes).
	Alcoholis,		3 ounces (93 grammes).
	Syr. aurantii,	q. s. ad	16 ounces (500 grammes).

M. Sig. : $\mathfrak{S}i$ or $\mathfrak{S}i$ t. i. d., with or after meals.

A. Rixa, of New York, ¹⁷⁶_{Dec., '94} has obtained cessation of the intense dyspnœa, sometimes present in these cases, by placing the patient's hands in hot water and the administration of hot beverages. As an abortive, he recommends the local application, by means of the douche, of Marchand's peroxide of hydrogen or hydrozone, 1 part to 2 of warm water of the former, or 1 to 3 or 4 parts of the latter. When the disease is to appear he gives

M. Sig : A teaspoonful four or five times a day the first week.

During the second week he gives the remedy every three hours in teaspoonful doses, adding the following:—

R Terpin hydrate, 1 drachm (4 grammes).

M. fiat capsulæ no. xij.

Sig. : Two capsules every two to four hours.

These preparations successfully prevented the asthma during the entire season in a marked case.

W. H. Weaver, of Chicago, ⁶¹_{Feb. 9, '95} reviews the subject, and, besides the measures usually recommended, lays stress upon the importance of removing any posterior hypertrophy which may be present, and on the cauterization of the sensitive areas by means of a solution of chromic acid. An old hay-fever sufferer ⁵⁹_{July 27, '95} forcibly illustrates the remarkable effects in his case obtained through exercise on the bicycle, which even succeeded in arresting attacks.

ACCESSORY CAVITIES

Empyema of Antrum.

Avellis, of Frankfort-on-the-Main, ¹¹⁵¹_{B. 2. H. 3, '96} reports several interesting cases which had come to be treated for an entirely different affection, and in which empyema of the maxillary sinus was the real cause of disease. A young girl of 18 years, who could no longer use the sewing-machine on account of headache, was by chance discovered to be suffering from empyema of the antrum, recovery following suitable treatment within two months. A case of temporary œdema of the face was also due to empyema of the antrum, and the author advises in such cases examination of the accessory cavities. Rudeaux, of Paris, ³⁷_{Sept., '95} observed a case of empyema in an infant 3 weeks old.

Dundas Grant, of London, ¹³⁶_{June 15, '95} recalls the fact that affections of the sinuses can frequently not be cured because several of them are simultaneously diseased. Thus he reports a case in which nasal suppuration continued, notwithstanding treatment of the diseased frontal sinus, the patient recovering only after opening of the antrum and treatment of an unsuspected sinusitis. Another case was exactly the contrary, and in another irrigation of the sphenoidal sinus and curetting of the fungosities at the level of the middle turbinated body cured a sinusitis which had been treated in vain by the usual methods.

Charles H. Baker, of Bay City, Mich., ⁵⁹_{Mar. 9, '96} reports a case which he considers unique, from the simultaneous occurrence of abscess of the antrum of Highmore and of the mastoid cells, the latter being the direct result of the former. Strazza ⁶²⁴_{Feb., '95} reports a

case simulating so-called "caseous rhinitis." R. Claoué¹³⁶ observed a case followed by acute secondary infection of the left upper sinuses, with meningeal manifestations and death; and Panas, of Paris, ¹⁴Mar. 13, '95 a case complicated by orbital osteoperiostitis, with perforation of the vault, abscess of the frontal lobe, and atrophy of the optic nerve, followed by death. A. H. Marvin, of Cleveland, Ohio, ²²²Oct. 9, '95 describes a case in which recovery followed the removal of necrosed bone in the nasal cavity. W. Scheppegrell, of New Orleans, ¹¹Sept., '95 cites a case of alarming hæmorrhage following the opening by the drill of the antrum of Highmore through the alveolar process, and repeated whenever the gauze packing was removed.

Walter J. Freeman, of Philadelphia, ⁶¹Nov. 30, '95 following Lichtwitz, uses a straight trocar and cannula, but, instead of making the opening as the latter does in the Mikulicz-Krause position far back, he perforates low down and more anteriorly. The nasal duct lies from thirty to thirty-five millimetres from the naso-labial junction, and unless it opens in a furrow its exit is high up under the turbinal. Keeping close to the floor of the nasal fossa, it may at times be necessary to penetrate thicker bone, but this is quickly and almost painlessly done, and the disadvantage is compensated for by entering the cavity near its bottom and thus securing better drainage, while the risk of injury to the tear-duct is avoided and a resting-place for the head of the tube is obtained inside the pyriform aperture. The inferior turbinal and naso-antral wall beneath it are first anæsthetized with 10-per-cent. cocaine solution; using this trocar and cannula, a few taps with the mallet causes it to penetrate the wall, the entrance into the antrum being unmistakably recognized by the absence of further resistance. Withdrawing the trocar, warm sterilized normal salt solution is at first gently, later with considerable force, syringed through the cavity. Should the water return perfectly clear, even after repeated flushing, the cannula is removed and no harm results. He advocates *repeated* flushing, for in one case he used over a pint of water before obtaining a trace of pus, but finally washed out a pus-cast of the cavity, the presence of which had caused a marked œdema of the eyelids on that side. When pus is present, however, he does not remove it at once, but re-introduces the trocar, removes the two nuts, and, holding the trocar accurately in place, the hand resting against the patient's face, withdraws the cannula. It is to render this possible that the trocar is twice the length of the cannula. He then slips a drainage-tube over the trocar till it penetrates the cavity and, withdrawing the latter, completes the washing of the sinus by

syringing through the long silver tube in the set (the wash-tube), which accurately fits the permanent tube. If pus is obtained, the tube has been correctly placed. The antrum being thoroughly cleansed, air is blown through to dry it, and an antiseptic powder is insufflated. The operation, including cocainization and treatment, takes but eight minutes, and few patients complain of any pain. The physician should treat the case for the first few days until the nose becomes accustomed to the tube; later, the patient can learn in a minute to pass the tube and cleanse the cavity for himself.

The disadvantage is that the cure is delayed beyond that reported for some of the other antral operations, but, when once healed, these cases do not seem to have a tendency to recur.

John Dunn, of Richmond, Va., ⁸¹ Aug., '95 makes a plea for a large opening and the dry treatment in cases of long standing of empyema of either the frontal or maxillary sinus. As regards after-treatment, the purulent contents of the antrum should be removed, which can be done most satisfactorily by packing the cavity with iodoform gauze and then withdrawing and replacing fresh gauze until this comes away dry. When satisfied that the antral walls are dry, they should be well dusted with some antiseptic powder, preferably one consisting of equal parts of iodoform and boric acid. The antrum should then be packed with iodoform gauze, which should be removed, the cavity thoroughly dried, dusted anew with the powder, and fresh gauze replaced twice a day until there is a cessation of the purulent discharge. The judicious use of peroxide of oxygen is advised.

Raugé, of Challes, ³ Oct. 13, '94 in reviewing the surgery of the antrum and its progress during the past ten years, states that, when the operator is thoroughly familiar with intra-nasal technique, lavage through the natural meatus is to be preferred. When trephining must be done, the alveolous of a molar tooth is the better site. The opening through the canine fossa should be reserved to use in cases which require tamponing and curetting.

Eugene S. Talbot, of Chicago, and M. H. Fletcher, of Cincinnati, ⁶¹ Nov. 24, '94 both advise opening the antrum at the base of the malar process, midway between the root of the second bicuspid and first permanent molar. In this position the lowest point in the cavity can nearly always be reached without entering the nasal cavity. Between them the authors have examined 7000 antra, and conclude that antral disease is very seldom caused by diseased teeth.

Watson ¹¹⁹ Sept. 29, '95 recommends the use of a solution of zinc sulphocarbolate, 5 grains (0.32 gramme) to the ounce (30 grammes), in-

jected into the cavity after irrigation with an antiseptic solution in cases of empyema of the antrum which do not yield to antiseptics after proper opening of the cavity.

J. Kekwick⁸⁴¹_{May 1, '95} reports a case of empyema of the antrum apparently of tuberculous origin. The following reasons are given in support of the diagnosis: (1) the chronic course of the case, with no local causes, such as loose sequestra; (2) the tuberculous character of the pus; (3) the amenability of the disease to iodoform; (4) the history of the patient (uncle died from phthisis; sisters suffering from phthisis; no signs of tubercle in the patient herself, but a queried history of tuberculous cervical glands—*ciatrices*), and (5) the bacilli in the pus which was washed directly out of the antrum through the nose. W. J. Means²³³_{Oct. 2, '94} also reports a case of supposed tuberculosis of the antrum.

Tumors of the Antrum.—Symonds¹¹_{July, '95} showed before the Laryngological Society of London, several polypoid masses which he had removed from the right maxillary sinus. The largest measured about seven-eighths of an inch in length. They were all attached about the same site and projected downward, the aperture in the alveolus being enlarged, and the polypi which projected through the opening were paler in color and had a denser covering. A case of carcinoma of the antrum is reported by John Dunn, of Richmond, Va.,¹_{Sept. 29, '94} in which the malignant growth had been preceded by nasal polypi. The author cites a case of Fink showing that polypi are at times followed by, if they do not degenerate into, carcinomata, and that they may thus bear a causal relation to the latter.

Reinhard¹¹_{Apr., '95}¹¹⁵¹_{No. 230, '95} reports a case of carcinoma of the antrum presenting the symptom of empyema. A probe coming in contact with soft masses of tumor in the cavity occasioned a suspicion of malignant growth, confirmed by histological examination. Operation led to complete recovery. A. H. Cleveland⁹_{Mar. 9, '95} also records a case of carcinoma of the right antrum.

Foreign Bodies of the Antrum.—Brunschwig³⁷_{Aug. 18, '95} reports a curious case. A patient, after extraction of a tooth, suffered from a fistula communicating with the antrum. Morsels of food penetrated into the latter and the patient introduced into it, successively, pieces of straw, of wood, cotton, etc. The suppuration and fœtor present were only overcome after considerable trouble. Baratoux, of Paris,⁷³_{Apr. 6, '95} reports a case in which tampons were gradually accumulated in the cavity and assumed the position of a foreign body, and another in which a laminaria was accidentally allowed to fall back into it.

M. Gouly²⁸⁶_{No. 1, '95} reports a case of foreign body in the maxillary

sinus. While washing the sinus after an operation the patient made an abrupt movement, causing the end of the cannula to break off and remain in the sinus. Eight days afterward the foreign body was expelled from the nasal fossa while the canal was being washed out. Rhinoscopical examination showed considerable hypertrophy of the mucous membrane of the middle meatus. The end of the cannula, which was conical in form, measured fifteen millimetres in length and six millimetres in breadth at its base,—almost the extreme limits of the size of the largest semilunar hiatus.

Empyema of Frontal Sinus.

Müller ¹⁰⁹_{Apr., '95} distinguishes two varieties of empyema of the frontal sinus,—acute and chronic. The first is very rare. He has seen but three cases, all ending fatally and all apparently due to an attack of influenza. The onset in such cases is sudden,—violent hemicrania with lancinating pain propagated along the nose. Later, ptosis, with tumefaction of the upper lid, exophthalmos, and diplopia, supervene. The chronic form may succeed the acute or the disease may pursue a torpid course from the beginning. A localized cephalalgia on one side, over the eye, is quite characteristic. Later, when the emergent duct is completely closed, the cavity is dilated by the retained products of inflammation which may possibly make an escape by the inner side of the orbit. For this variety Fuch recommends that the anterior wall of the sinus be completely cut away, the pus drained off, and the cavity so completely curetted as to leave none of the granulating residue of ulceration. All of his cases so treated did well. Müller, however, prefers to enter the sinus from below.

Empyema, commencing in the ethmoidal sinuses, may make its way forward into the orbit in two ways: in one, perforation occurs after tumefaction of the upper lid and exophthalmia; in the other the ethmoidal cells are so distended as to produce a fullness at the inner angle of the eye, sometimes mistaken for a neoplasm if extreme caution is not taken. Müller saw, in two of these latent cases, pus proceeding from the ethmoid and opening into the lachrymal sac.

G. G. Martin ⁷³³_{July 4, '95} ⁷⁶⁰_{Aug. 24, '95} states that empyema of the frontal sinus, attended with a bulging backward and downward of the orbital plate, may be attended with unusual difficulties of diagnosis. If catheterism through the nares is practicable the way is easily cleared. This manœuvre is extremely difficult in the normal state, but is more simple and effective when the sinus is distended.

Joseph A. Andrews, ⁸¹⁴_{Dec. 1, '95} in a severe case of empyema of the frontal sinus, treated the case like one of mastoid disease. He laid the orbital margin bare from the pulley of the superior oblique to the inner canthus, enlarged the wound, and chiseled away the roof-like projection of the brow; so that the roof of the orbit was about on a level with the rest of the wound. He made no attempt to go through the infundibulum into the nasal cavity, as on several occasions he had lost patients from suppurative meningitis following operations in the upper parts of the nose. The cribriform plate is the passage through which the germs enter the cranial cavity. For this reason he carefully avoids the upper part of the nasal fossa in suppurative processes. Herzfeld, of Berlin, believes ⁶⁹_{No. 12, '95} that the diagnosis of chronic empyema may sometimes be rather difficult, and the cure of the affection sometimes dubious, even when the sinus is opened by operation. Opening by the nose is too dangerous, as the lamina cribrosa may be injured by the instrument. He recommends the frontal operation and describes three cases in which he performed it successfully. Hajek ¹⁴_{Dec. 5, '94} remarks, however, that, although in the normal state it is not easy to perform catheterization of the frontal sinus, a cannula may be easily inserted in pathological cases after removing a portion of the middle turbinated body.

Chiari, of Vienna, ³⁷_{Oct., '95} showed before the Society of Laryngology of that city a child on whom he had performed trephining of the frontal sinus some months previously, for the removal of a large piece of necrosed bone which had given rise to abundant purulent discharge from the nose. Chiari was unable to state whether the necrosis was due to tuberculosis or syphilis, as he could find no basis for a differential diagnosis.

Flatau ¹³⁶_{Jan. 1, '95} showed to the Society of Laryngology of Berlin two cases in which he had opened the frontal sinus by making the incision in the skin in the fold of the corrugator supercillii muscle.

Lagrange ¹⁸⁸_{Feb. 17, '95} describes a case in which the abscess opened spontaneously at the corner of the eye.

A new method of attacking the frontal, ethmoidal, and sphenoidal sinuses for the purpose of evacuating pus or removing new growths is reported by Gussenbauer, ⁸_{No. 21, '95}; ⁵_{Nov., '95} who describes two successful cases in which the operation was performed. The method was devised with the view of giving ample room for the operation, and as far as possible freedom from the disfigurement the scar entailed. The operation was as follows: An incision was made, including the skin and periosteum, through the eyebrow along the supra-orbital margin, passing down the side of the nose

close to the inner angle of the eye, and uniting with a similar incision on the other side by a transverse incision over the bridge of the nose at the juncture of the osseous and cartilaginous portions. By the use of a sharp chisel the nasal bones were divided from their cartilage and the nasal processes of the frontal bones were resected; the resection was then carried upward through the lachrymal bones and the portion of the frontal bone forming the superior part of the orbit; after the division of the ethmoid bone and the attachment of its perpendicular plate from the vomer the bone with the attached superficial structures were turned back in one flap, laying bare the ethmoidal and frontal sinuses. There was very little bleeding, although the nares had been previously plugged on account of hæmorrhage. The patient made a good recovery, the bone, which was replaced and sutured in position, uniting by first intention. The sinuses were packed with iodoform gauze, with drainage through the nares.

In a second operation the incision was carried down the median line of the nose instead of on either side. The nasal bones were separated from each other, resected, and turned back with the attached flaps on either side. Although there was as much room for operating, the operator prefers the first method, as he believes the scars are less noticeable and the cosmetic effect is therefore better.

Sphenoidal Sinus.

Laurent ¹³⁶ _{v.15,p.767, '94} ⁸¹⁴ _{Feb.1, '95} publishes an article on catheterism and exploration of the sphenoidal sinus without a speculum. He states that the speculum is not always indispensable in the examination of the sphenoidal sinus. The distance from the opening of the sinus in the superior meatus to the nasal opening is six and one-half centimetres. The extremity of a probe curved at an obtuse angle is introduced into the nose and carried backward parallel to the direction of the septum, while the shaft is held parallel to the dorsal line of the organ. At the depth of six and one-half centimetres the extremity of the probe is turned through a quarter of a circle, the handle is depressed and the sound enters the sinus in an outward and backward direction, the cavity being then easy to explore in all directions. A second procedure is to introduce the sound to a depth of seven and one-half centimetres to the postero-superior angle of the nasal cavities, to draw it forward one centimetre, and then to revolve it through a quarter of a circle.

Ludwig's Angina.

James E. Newcomb, of New York, ⁹⁹ _{Sept.19, '96} ¹ _{Nov.23, '96} in a paper on Ludwig's angina, states that the specific identity of the affection

has always been a mooted point. Ludwig gave as its characteristic features (1) a peculiar wooden induration of the tissues, not receiving impression; (2) a uniform spread of this induration in such a way that it is always sharply bordered by a zone of entirely unaffected cellular tissue; (3) a hard sublingual swelling with a bolster-like mass around the interior of the lower jaw, of a deep-red or bluish-red color. Statistics of 58 cases are given by the author. Of these 44 were in men, 9 in women, and 5 in infants. The oldest patient was 66 years of age and the youngest 3 months. Forty per cent. of all the cases occurred between the ages of 20 and 30 years. Recovery is noted in 33 and death in 25. In 9 bacteriological examination was made with the following results: *Streptococcus pyogenes*, 4; *staphylococcus pyogenes aureus* and *albus*, 1; *erysipelas cocci*, 2; and in 1 instance an undetermined microbe a little longer and narrower than the *bacillus coli communis*, but clearly distinguishable from the latter by culture-reactions.

H. Ripault³⁷_{Sept., '95} reports a case of Ludwig's angina in which the progress of the symptoms was at one time exceedingly rapid, the infiltration of the soft parts almost doubling within a few hours, the appearance of sudden and alarming dyspnoea, necessitating speedy opening of the trachea, which proved to be calcareous. While in most cases the tongue is but moderate in size, in this patient it was as large as in parenchymatous glossitis and was deeply indented by the teeth. Trismus usually disappears soon after the evacuation of the diseased area, but in this case it remained intense for several weeks, and at the time of writing, seven weeks after the appearance of the affection, it was still great enough to prove troublesome to the patient.

E. P. Hughes, of Sheffield,⁶_{Mar. 23, '95} reports a fatal case of Ludwig's angina arising from an inflamed carious tooth. The patient, a man aged 31, had suffered for ten days from toothache. On admission to hospital the front of the neck was swollen, hard, and brawny, not pitting on pressure; the voice was reduced to a whisper and swallowing was impossible. The swelling extended from the angle of the jaw downward and forward to the third costal cartilage; the jaw was fixed and the tongue forced into the roof of the mouth. An incision was made in the median line, from the symphysis to the lower border of the larynx, the parts being pale and hard to the touch; there was no sign of pus. During the operation the respiration became embarrassed and the pulse failed, and, notwithstanding tracheotomy and artificial respiration, etc., it was found impossible to resuscitate the patient.

NASO-PHARYNX.

Adenoid Vegetations.

The lamented Wilhelm Meyer, of Copenhagen, ³⁷³ ⁶⁷³ in ^{Nos. 6, 7, '96} in an elaborate and interesting article, gave the results of his painstaking efforts to collect evidence of the existence of this variety of growth in different parts of the world and in different races. In Greenland, amongst 60 Esquimaux children between 6 and 14 years of age, Helms only found 16 free from adenoid vegetations. In North Dakota Quarry found adenoid vegetations frequently amongst the native tribes of Indians, but the growths were very little developed in adults. Cautley, of Hong Kong, reported that the native Chinese of the Mongolian race, as also those belonging to the mixed Chinese-Portuguese race, frequently suffered from them; while, in Bangkok, Demitser rarely found the disease amongst the native Siamese. Romback, medical superintendent of the Dutch-Indian Colonies, collected evidence from several military surgeons with the following results: In Singkil, on the northwest coast of Sumatra, 113 natives were examined; of these, 3—i.e., 2.6 per cent.—had adenoid vegetations; on the island of Amboika 326 school-children were examined, none of the girls and 2 of the boys (0.8 per cent.) being found to have adenoid vegetations; on the island of Saparua none of 100 adults examined had the growths mentioned, while 5 out of 717 school-children (0.7 per cent.) suffered from them. Meyer accordingly comes to the conclusion that adenoid vegetations are to be found in varying degrees of frequency in at least three parts of the world,—viz., Europe, America, and Asia; the Mongolian race is almost as much predisposed as the Arian; a warm climate seems less favorable to their development than a cold one. He has, furthermore, with great perseverance, studied portraits and busts in numerous European collections in order to detect, as far back as possible, undoubted sufferers from these growths. As a proof of the existence of adenoid vegetations in the beginning of our century, the numerous likenesses of the famous sculptor, Canova, are mentioned, all showing the artist with an open mouth, a narrow nose, and a languid look; and one of his pupils has also stated that he was somewhat deaf. There is also undisputed evidence that the Emperor Charles the Fifth had adenoid vegetations, his portraits showing a face typical of these growths; he also notoriously suffered from asthma, and that this disease was not produced by nasal polypi is proved by the fact that the portraits taken early in life are much more typical than the later ones. King Francis the Second, the first husband of Mary, Queen of

Scots, who, according to a French otologist (Potiquet's recent investigation), suffered from adenoid vegetation, had, in Meyer's opinion, perhaps suffered from these growths; but he points out that, the nose being far from typical, doubt must therefore exist whether he did not suffer from nasal polypi. Amongst specimens of ancient sculpture Meyer has not found a single instance which might serve as a proof of the existence of adenoid vegetations in Greece; this may, however, be easily explained by the fact that the ancient Greek artists had a tendency to idealize the human features. Several ancient Roman statues and busts, on the contrary, show undeniable evidence that adenoid vegetations existed as far back as Roman art goes. As the most pronounced examples Meyer mentions Nos. 80, 189, and 192 of the Chiaramonti Gallery in the Vatican, of which three busts the first two mentioned represent children. He finally concludes that it is probable that adenoid vegetations have at least existed ever since the early ages. (Report of Corresponding Editor Holger Mygind, Copenhagen.)

In addition to the symptoms ordinarily associated with hypertrophy of the adenoid growth, Harrison Allen, of Philadelphia, ⁹_{June 22, '95} describes a group of cases in which the obstruction is due not to a growth being larger than normal, but to a congenitally narrowed naso-pharynx. He lays especial stress upon a third group of cases, for which he proposes the name "adenoid disease," and claims that this does not excite mischief by reason of its influence, in any way, upon the functions of respiration or excite catarrhal disease, but that its effects are noted entirely upon the general nutrition of the patient, which is always abnormal. He suggests that the relation of these phases of ill health belongs to the same group of diseases as acromegaly and myxœdema. He invites attention to the advisability of studying the adenoid mass in connection with the pituitary body and pineal gland, and requests that, in all cases of death of children who are known to suffer with adenoid growth in addition to the cause of death, the base of the skull embracing the pituitary body and the adenoid of the pharyngeal vault be removed in a single piece and prepared in the usual way for microscopical examination.

Régis, of Bordeaux, ²⁰⁰⁷_{'95} having suggested that adenoid growths might perhaps be considered as a sign of degeneracy, de la Combe, of Bordeaux, has endeavored to elucidate the question. Statistics on the subject have already been collected by Balme, who, in examining for adenoid vegetations backward and degenerate children at the Vaucluse Colony, found that out of 113 children examined 56 suffered from adenoid vegetations or en-

larged tonsils, or most frequently both lesions simultaneously. These children likewise presented various malformations. The frequency of this coincidence leads to the conclusion that in a certain number of cases adenoid vegetations are, like the stigmata accompanying them, a sign of degeneration. They cannot, however, be looked upon as such unless accompanied by a number of stigmata indicating their real character.

F. E. Hopkins, ¹_{Jan. 26, '95} in an article on the recurrence of lymphoid hypertrophy in the naso-pharynx, draws attention to the possibility of the recurrence of naso-pharyngeal adenoid vegetations after their previous removal. He cites several illustrative cases and quotes the opinions of many authors. He admits that recurrence does take place, that it takes place more frequently than is usually supposed to be the case, and that it may happen even after every vestige of the tissue has been removed from the naso-pharynx. The author strongly insists upon complete removal of the growths, the use of a general anæsthetic in children up to 15 years of age, and suggests that great care be taken in the after-treatment of the cases, especially as regards the hygienic surroundings.

Alexander Wilson, of Manchester, ⁹⁰_{Feb., '95} discusses adenoid vegetations from the stand-point of the anæsthetist. In administering anæsthetics he adopts the following routine: In adults, or children old enough not to be alarmed by the apparatus, he prefers to give nitrous oxide and ether to begin with, as, by it, deep anæsthesia can be most quickly and safely induced. During the operation the anæsthesia, if necessary, is kept up with chloroform cautiously given from lint. In the case of young children he begins with chloroform, and, if taken well, continues it throughout the operation. If there be reason, from the feeble condition of the patient, to expect faintness, he changes to ether as soon as the patient becomes semiconscious, and continues with it. If there be any delay in inhaling the chloroform from feeble respiration, he changes at once to the ether. In the same way, if ether cause irritation of the throat and excessive secretion of mucus, there being no contra-indications, he replaces it by chloroform.

The most advantageous position is with the patient upon his back, the head fully extended, with the vertex supported on the table or the head hanging over the end of the table. It places the patient in the safest position for the administration of any anæsthetic, and in one which is directly antagonistic to the production of shock. It is the most stable position, and the patient remains unsupported in the same situation, is not liable to roll about, and any anæsthetic difficulties which might arise can be treated with-

out moving the patient. The seat of operation is directly under the surgeon's hands, and all necessary manipulations can be performed with the hands in the pronated position,—the customary position taken by the hands in the performance of all delicate manipulations, surgical or otherwise. In cases of only slight bleeding the blood gravitates into the pharynx and the cup formed by the hard palate, and leaves the air a free passage to the larynx. This position has been objected to on the ground that the congestion from the dependent position increases the hæmorrhage. This is probably true to some slight extent, but the greater facilities for the arrest of hæmorrhage afforded by the position more than counterbalance this objection.

Arnold Larsen, of Nykjäbing, Denmark, ³⁷⁴_{p.371, '94} having strongly recommended the administration of chloroform in all cases of removal of adenoid vegetations, Holger Mygind, of Copenhagen, feels ³⁷³_{No.37, '94} ⁶⁷³_{June, '95} it necessary to warn against their indiscriminate use in this operation. His principal objection is the great danger, as shown by the comparatively numerous cases of death reported in English medical literature, most of the patients having been healthy children. He is inclined to believe that these frequent fatal results are due to the fact that the operation concerns a part of the respiratory organs, and that, being considered a minor one, the narcosis is less attentively watched. Another objection is that the administration of a general anæsthetic, in the vast majority of cases, is unnecessary; personally he has only been obliged to use general anæsthesia in 4 out of 254 operations performed by him. Wilhelm Meyer, H. Schwartz, B. Fraenkel, Kuhn, Trautmann, and many other well-known specialists are also in favor of operating generally without narcosis. If, however, narcosis is considered necessary, Mygind advises the use of a very superficial anæsthesia without discontinuation of the normal reflexes, the patient resting upon the right side, with lowered head. (Report of Corresponding Editor Mygind, Copenhagen.)

Arslan, of Padua, ³¹_{Oct.9, '95} ⁶⁷³_{Nov.} comments on the frequency of adenoid vegetations in Italy, stating that, of 315 children examined in the schools of Padua, he had found the growths present in two-thirds of them. He is inclined to attribute the preponderating rôle to heredity, a number of his patients showing that their antecedents presented exactly the same symptoms. In six cases he brought about the cure of stridulous laryngitis by the removal of adenoid vegetations, and in another case the symptoms of Jacksonian epilepsy disappeared in the same manner. He uses Gottstein's curette in operating, with bromide of ethyl as an anæsthetic. He never employs cocaine in children. It is cus-

tomary to establish the diagnosis by means of rhino-pharyngeal palpation, but he finds that in most cases posterior rhinoscopy is sufficient. Dundas Grant, of London, is a warm partisan of bromide of ethyl, and never operates in these cases without it. Ethyl-bromide anæsthesia is also recommended by George Morgenthau, of Chicago.⁶¹

J. Solis-Cohen, of Philadelphia,⁵⁹ is not in the habit of using an anæsthetic except in very nervous patients. He expresses the opinion that it is not so important to remove all the tissue, but only sufficient to cause the hyperplasia to subside. The lymphoid structure here, like all other tissues, has some necessary function which should not be destroyed by removing it entirely.

Sanford³ reports a death from convulsions after removal of adenoids. The case was that of a nervous and anæmic boy, aged 11, whose naso-pharynx was scraped for adenoids, under a 10-per-cent. cocaine solution. The same procedure had been previously done without any bad result. Four hours after the operation he had a rapid pulse and seemed somewhat unstrung. One hour and a half later Sanford was hurriedly called and found the lad just recovering from a general convulsive attack from the effects of which he was still twitching. A few minutes later another fit came on, and death resulted, apparently from asphyxia. Sanford is of the opinion that the first convulsion was of (nasal) reflex origin, coming on as the effects of the cocaine passed off, and during this basal hæmorrhage took place, causing the second fatal attack.⁸¹⁴

In reporting a case of secondary hæmorrhage consequent upon removal of adenoid vegetations, R. Beausoleil¹³⁶ concludes that age appears to be an important factor, in fact the most important, to judge from statistics. Almost every patient in whom this complication was noted had passed the most favorable period for performing the operation,—namely, between 6 and 10 years. At that age hæmorrhage is less to be feared, and, generally speaking, it may be said that children bleed the less, the younger they are. ^{June 15, '95}

Marage²²⁵ in the medical treatment of adenoid vegetations, uses an aqueous solution of resorcin, 50 to 100 per cent. He touches the growths with absorbent cotton mounted on a suitably curved caustic-holder and soaked with the solution, passing the instrument behind the soft palate. The turbinated bodies may also be shrunk with a solution of cocaine, and the pharynx reached through the nasal passages. The parts touched with the solution become covered with a whitish crust. There is no pain and after the second application the child offers no resistance. There is no inflammatory reaction and the patient can eat or drink

immediately afterward without taking any special precautions. The author states that, at most, from six to ten applications, made every two or three days, cause the symptoms to disappear and the patient to be completely cured.

Edmund Chaumier, of Tours, ¹⁶²_{Aug., '96} made a trial of this treatment in three cases, but obtained no result after nine, ten, and fourteen applications; the pharynx remained as much obstructed as before and he was obliged to curette. He consequently concludes that these applications of resorcin are absolutely useless.

Helme, of Paris, ¹⁴_{May 12, '96} calls attention to the fact that, though numerous studies have been made on adenoid vegetations, but little attention has thus far been given to inflammations of the pharyngeal tonsils, whether normal or hypertrophied. To the imperfect knowledge of these cases is due the incorrect idea that medical treatment often suffices to cure hypertrophied adenoid vegetations. When medical treatment has sufficed, it is because the case was one of adenoiditis in a child, for instance, who suffered no discomfort from adenoid vegetations present, but who suddenly, under the influence of some trifling cause, such as cold, developed symptoms belonging to the complexus of adenoid vegetation. In such a case either the inflammation has involved a normal gland, to subside in a few days, returning to normal, or it has attacked an already diseased tissue, a chronic condition being thus established. All the symptoms peculiar to adenoid vegetations then appear or become more marked,—snoring, night-mare, night-terrors, mouth-breathing, etc.; and at the same time fever is observed with temperature from 39° to 40° C. (102.2° to 104° F.), painful swelling of the glands at the angle of the jaw, buzzing in the ears, and pain in the back of the head.

Tuberculosis of the Pharyngeal Tonsil.

In the last issue (vol. iv, p. D-47) allusion was made to the two cases reported by Lermoyez in which tuberculosis of the lungs followed the removal of adenoid vegetations. According to Dieulafoy, ¹⁰_{Apr. 30, May 7-21, '96} in addition to the classical forms of tuberculosis of the pharynx, there is a variety of primary tuberculosis, insidious and escaping observation, but nevertheless frequent.

Looking upon the tonsils as a common entrance for Koch's bacillus, Dieulafoy maintains that during a first stage the bacillus remains localized in the tonsils, in a second stage it penetrates as far as the lymphatic glands, and in a final stage attacks the lungs. The palatine, pharyngeal, or lingual tonsils constitute an easy and frequent point of penetration for Koch's bacillus; a latent tuberculosis results, which may assume the appearance of ordinary adenoid vegetations or of hypertrophy of the tonsils.

Dieulafoy's views are based upon experiments with animals inoculated with fragments of vegetations or of tonsillar tissue. In no case was any histological examination made. While Lermoyez found 2 cases of tuberculous adenoid vegetations out of 50 cases, Dieulafoy found 7 out of 35 cases.

Helme¹⁷_{Sept. 7, '95} thinks that the contradiction is only an apparent one. During the first period of bacteriology it was thought that pathogenic bacteria were external to the system, causing disease only when they penetrated it. Later on it was recognized that many pathogenic varieties were inmates of the cavities of the body, such as the pneumococci of the saliva and the bacterium coli commune of the intestine. More recently still Straüs has proved that Koch's bacillus may normally exist in the nose. It is hence not difficult to inoculate tuberculosis into animals by means of tissues taken from essentially septic regions, but it does not follow from this that the patients from whom these tissues were taken are tuberculous. The bacillus may at first exist on the surface of the tonsil; it is only during a second stage that inoculation occurs and the tonsil becomes invaded by the bacillus.

Broca, of Paris,¹¹⁵³_{Nov. 6, '95} states that he has only once seen tuberculous angina develop after the removal of adenoid vegetations. As no immediate histological examination was made, he is unable to state whether the primary lesion were tuberculous or whether secondary inoculation of the operative wound had occurred. After having observed this case he sent to Pilliet, of Paris, specimens from one hundred consecutive patients, but in no case did the microscope reveal tuberculosis. This result does not accord with the experimental results of Dieulafoy; however, bacilli strewn on the surface of a healthy mucous membrane may readily give such results as Straüs has proven as regards the pituitary membrane. In such a case the mucous membrane is infected and forms a source of danger, but it is not tuberculous; it may even be penetrated by the germs without becoming tuberculous, glandular infection occurring without a specific lesion of the place of entry. This fact, which has been experimentally proved by Cornet, should lead to an attitude of reserve in respect to the conclusions which Dieulafoy considers may be drawn from the fact that glandular cervical tuberculosis is not uncommon in such subjects.

Simonin, of Limoges,¹¹⁴⁵_{p. 69, '95} states that adenoid vegetations are operated on in order to allow the child to develop normally and to avoid the complications which may accompany them. Among the uncommon accidents to be borne in mind as consecutive to the removal of these tumors is the mobilization of the tuberculous germs.

Hypertrophy of the Naso-Pharyngeal Tonsil.

Charles A. Parker, of London, ²⁸⁵_{Mar. 20, '95} states that in nasal obstruction, especially when caused by post-nasal growths, respiration is nasal, and not buccal, during sleep.

Ingals, ⁶¹_{Sept. 29, '94} in an able and exhaustive article on hypertrophy of the pharyngeal tonsil, says that this trouble is not so common as is supposed. Among the records of private patients since 1881, histories of between 11,000 and 12,000 persons, of whom about 90 per cent. consulted him for some disease of the chest, throat, or nose, show that of these only 2 per cent. had hypertrophy of Luschka's tonsil. He thinks that girls are more frequently affected than boys, and that 50 per cent. more country-people are affected than residents of cities. The disease probably never develops after puberty, but nearly always in infancy or childhood; and from the histories of 100 selected cases he found it most frequent between the ages of 2 and 15, 54 per cent. occurring between the second and eighth year and 37 per cent. between the ninth and sixteenth year. Seven cases were found between the ages of 18 and 25, and one each at ages of 26 and 37, respectively. A critical examination of the histories to ascertain when the symptoms first appeared would indicate that the trouble was certainly developed in 90 per cent. of the cases in infancy or very early childhood.

Jonathan Wright, of New York, ¹¹_{Aug., '95} speaking before the American Laryngological Association on the subject of cysts of the oro- and naso-pharynx, stated that sinuses in the naso-pharyngeal mucous membrane are not very common, and that cysts are very rare. Many catarrhal cases owe their origin to neither cysts nor sinuses. Finally the so-called "bursa" is not a normal characteristic, but the result of chronic inflammations. Such cysts are formed by the agglutination at their edges of the folds and projections of the mucous membrane in infancy and adolescence, whereby result sinuses or closed cavities. In the former thick muco-pus may be produced and discharged, while in the latter the accumulation of and distension by muco-pus of the surrounding walls gradually leads to cyst-formation. Glandular retention-cysts are excluded, as glands are exceedingly scarce in the neighborhood of lymphatic tissue in the naso-pharynx, and, when they are seen, show no tendency to cystic dilatation.

Drawings made by the author of a section through the folds of the mucosa in the pharynx of a still-born child showed, near the bases of the folds, evident oblong spaces, either just where the lymphoid tissue bordered on the connective tissue or just within the confines of either of these two histological elements.

These spaces were lined with a single layer (frequently incomplete) of endothelial cells, and should be considered as lymph-spaces, visible, because they are not gorged with the round cells which crowd them elsewhere. It is possible that retention-cysts might originate from these spaces becoming closed cavities.

George Stoker, of London, ²_{Nov. 2, '95} reports a method of preventing bleeding from the pedicle in removing naso-pharyngeal tumors. The patient when anæsthetized is placed in the "head-down position" either by hanging the head over the end of the couch or by placing a hard, thick pillow underneath the patient's shoulders. A strong whip-cord is then threaded into two tubes capable of being introduced into the nasal cavities so as to form a loop at one end. The loop is passed up the nostril, preferably the larger one, and then brought down into the mouth between the anterior surface of the tumor and the posterior surface of the soft palate, and then passed backward behind the tumor and pushed right up to the point of attachment of the pedicle by the forefinger of the operator's left hand, while traction is made on the cord with the right hand. The whip-cord ligature is then twisted tight by means of the handle through which it is threaded, care being taken that it is not twisted so as to cut, but only to compress the pedicle. The wire *écraseur* or galvano-*écraseur* is then passed through the other nostril and pushed up to within about a quarter of an inch of the whip-cord ligature. The pedicle is then cut through with the wire, and if bleeding occur the pedicle can be further compressed by the whip-cord ligature as necessity may arise.

Basal Herniæ.

A comprehensive review of basal herniæ of the brain is published by Christian Fenger, of Chicago, ⁵_{Jan. '95} in connection with a case, seen by him, in which the hernia presented in the naso-pharyngeal cavity. There had been symptoms of obstruction of the nose from early childhood. A pedunculated polypus in the left posterior nares, apparently somewhat compressible, the pedicle being located at the root of the nose, led to the suspicion that cerebral hernia was present. Attempt at positive diagnosis by aspiration of cerebro-spinal fluid from polypus failed. Removal of polypus by the *écraseur* was followed by free discharge of cerebro-spinal fluid. The left nostril was packed with iodoform gauze, preparatory to radical operation to close the hollow pedicle. Osteoplastic resection of the superior maxilla, as devised by Van Langenbeck, was performed; the pedicle found, transfixed, and ligated, and recovery followed.

UVULA AND PALATE.

In a case recorded by H. Foster, of Kansas City,⁶¹ the uvula was cleft up to its junction with the palate, quite an area existing between the two organs. The patient had slight difficulty in deglutition.

P. Kock³⁷ quotes a case in which a conical uvula, four centimetres long and terminating with a bulb-like enlargement at the very tip, failed to produce the least symptoms, although it extended beyond the level of the tongue.

Tumors of Uvula and Palate.

W. Zurakowski⁶⁴⁰ publishes an exceedingly uncommon case, —that of primary cancer of the uvula, in a smith, 71 years old, who for some months had suffered from dysphagia and pain in the throat. On examination the uvula was seen to be enlarged, and its upper surface, as well as a portion of the soft palate, ulcerated and rather hard to the touch. The submaxillary glands were swollen. The uvula and a portion of the soft palate were removed by operation, the wound rapidly healing. The tumor was found, on microscopical examination, to be carcinoma keratodes.

Flatau¹³⁶ showed to the Laryngological Society of Berlin a patient suffering from a papillomatous tumor of the uvula. In an analogous case microscopical examination showed the tumor to be formed of adenoid tissue.

Von Eisenmenger,³⁰¹ in an article on plexiform sarcomata of the hard and soft palate, states that these growths were first observed by Nélaton and then studied by Robin, who looked upon them as adenomata. This, however, is not always the case, for true adenomata of the mucous glands of the palate are met with, though side by side with them are others entirely comparable to the mixed new growths or tumors of the parotid gland (sarcomata of Kaufmann). It is known that these mixed tumors spring from a congenital germ included in the gland, and the author believes it probable that such is the case in the palate,—a region in which the phenomena of development are rather complex. Von Eisenmenger adds five hitherto-unpublished observations to the seventy-six cases already recorded. The tumors in question are usually not of epithelial origin, but are much rather characterized by endo- or peri- thelial cellular proliferations, accompanied by elements of enchondroma, myxoma, lipoma, etc. These palatine sarcomata, like those of the parotid gland, are more often located on the left side, and never in the median line. Their growth is slow, operation being required only after eight to ten years, for only after such a lapse of time does the size of the tumor interfere

with mastication and respiration. Their benignity is real, but not absolute. Extirpation is usually easy by simple enucleation, a more complicated operation being rarely necessary.

Schmidt¹⁵⁸_{B.17,H.1,2} reports a case of alveolar sarcoma of the soft palate in a 12-year-old boy. The growth was about one and one-half centimetres long and of about the same width on the left side of the hard palate. One year before a similar growth had been removed from the same location. The tumor was covered with a deeply congested mucous membrane and had the appearance of being malignant. It was removed and the wound closed. Microscopical examination of the tissue showed it to be an alveolar sarcoma. Four months after the operation the parts were perfectly normal.

Walter B. Johnson, of Paterson, N. J.,⁵⁹_{Nov.17,'94} reports a case of sarcoma of the palate successfully treated with the toxins of erysipelas. The patient, a male aged 16, with no history of any hereditary taint or acquired syphilis, had always suffered from catarrhal trouble and hypertrophy of the tonsils, and generally during the winter had more or less frequent attacks of acute tonsillitis. A tumor of the palate was allowed to reach a considerable size before any medical opinion was sought.

On examination, a diseased area was disclosed which extended over the entire soft palate, pillars of the fauces, region of the tonsils, forward over the hard palate to within one-half inch of the incisor teeth, backward and downward, involving a portion of the pharyngeal wall, base of the tongue, affecting the epiglottis and invading the upper part of the larynx, but not extending to the true vocal cords. The infected parts were thoroughly impregnated with sarcomatous (microscopically found to be of the spindle-celled variety) deposit; the soft palate was increased to about three times its normal thickness; the new tissue consisted of cauliflower-like granulations, varying in size from a rice-kernel to a good-sized pea; some of the masses which made up the growth were undergoing an apparently superficial ulceration and discharging a purulent secretion; others contained distended and tortuous vessels, which gave them the dusky hue frequently observed in sarcomatous diseases; the uvula seemed to have been destroyed. There were several of the cervical glands involved; the largest one, however, was only about the size of the hazel-nut or filbert.

The injections of the toxins of erysipelas were commenced daily with 15 minims (1 cubic centimetre). The dose was increased each day until it had reached 60 minims (4 cubic centimetres). The toxins of the bacillus prodigiosus were used in doses

of 5 minims (0.32 centimetre) in combination after the dose had reached 35 minims (2.3 cubic centimetres).

The result of the treatment was a constant, steady, but slow, improvement in his condition, the sarcomatous material gradually disappearing, and at the time of writing, nearly one year after the injections were commenced, the patient is in an excellent physical condition, only one or two spots of ulceration remaining, his weight having increased from 86 to 107 pounds (39 to 48.6 kilogrammes). The uvula and a small portion of the epiglottis were destroyed by ulceration; cicatrization and contraction have taken place, and white bands of adhesion extend from the hard palate to all parts of the fauces.

Paralysis of the Soft Palate.

Bourges³⁷_{May, '95} has studied the question of paralysis of the soft palate following non-diphtheritic anginas. According to him, Gubler had admitted the possibility of such a paralysis, though the hypothesis did not meet with any support, as no direct proof was presented. In a case of angina, which, bacteriologically, was proved to be non-diphtheritic, and which lasted seventeen days in a child 7 years of age, Bourges observed, two weeks after the disappearance of the membranes, in the first place, convergent strabismus, then nasal intonation with trouble in swallowing, and finally incomplete paraplegia lasting a month. The membranes in the throat contained neither the Klebs-Lœffler bacillus nor the streptococcus.

Kustener¹³⁶_{July 1, '95} showed before the Laryngological Society of Berlin a woman, aged 54 years, who, during an attack of influenza, was affected by paresis of the left side of the soft palate and of the muscular membrane of the left posterior portion of the pharynx and by paralysis of the left vocal cord. For three days the patient was unable to eat; then she was able to take small amounts of liquid food, and on the seventh day solid food; swallowing became normal only on the sixteenth day. Mobility of the larynx returned slowly. On the eighth day the arytenoid cartilage showed slight spasmodic movements; on the sixteenth day adduction from the cadaveric to the median position was already to be seen, with return to the cadaveric position during respiration. During phonation undulatory movements were produced in the vocal cord. The affection was a paralysis of the recurrent nerve, of neuritic origin and on the way to recovery. Abduction re-appeared only later on. Kustener has observed a similar course in two other cases of paralysis of the recurrent nerve.

Lingual Tonsil.

A. Raoult ¹³⁶_{No. 11, '95} publishes an article on inflammations of the lingual tonsil of buccal and dental origin. Of 120 cases of more or less intense lesions of the lingual tonsil observed by him, in 35 cases (29 per cent.) dental and buccal lesions were found. The nose and the pharynx could not be incriminated as etiological factors.

The tonsillar hypertrophy, itself liable to inflammatory attacks, may, from its proximity, give rise to inflammation of the larynx; whence repeated attacks of acute laryngitis and even of tracheitis.

The treatment employed by Raoult is of the simplest kind, consisting naturally in buccal and dental antiseptics, by means of a boro-carbolized solution, the gums being afterward touched with tincture of iodine. Diseased teeth are removed only after disinfection of the mouth. At the same time mentholated oil is applied to the base of the tongue with the laryngeal probe. Lesions of the nose and pharynx are treated when necessary. Ten times only was it necessary, in the author's cases, to treat the enlarged tonsil with the galvano-cautery, improvement not having followed medical treatment.

L. Polyak, of Budapest, ¹³⁶_{Feb. 1, '95} describes a case of pre-epiglottic follicular tonsillitis in a tanner, 26 years old, who entered the hospital complaining of sharp pains in the hyoid region, increased on swallowing and accompanied by a chill and high fever; so that he could no longer swallow and breathed with difficulty. The lingual tonsil was very much swollen, red, covered with mucopurulent secretion, and exceedingly sensitive; the epiglottis was strongly inclined backward and exceedingly œdematous; the voice was clear. Next day the dyspnœa and pains on swallowing had not changed, but the follicles of the lingual tonsil were covered with small white masses,—a picture of typical follicular amygdalitis. The condition soon improved; the white masses disappeared in a few days, though some pain on swallowing was still present at that time and the lingual tonsil was still somewhat swollen; the œdema of the epiglottis was no longer present, and only a slight intumescence was to be perceived.

Similar cases are rather uncommon in literature, the majority having been published by Hagen, Fleischmann, Michelson, and Gurowitsch. The disease, however, cannot be so rare; the fact that physicians usually content themselves with examining the palatine tonsils explains why affections of the lingual tonsils pass unperceived. Until now no case of follicular lingual tonsillitis complicated by œdema of the epiglottis has been described.

The subject is reviewed by Beausoleil, of Bordeaux, ¹³⁶_{Dec. 9, '95} and Marion ²²⁰_{Jan. 19} and Winckler, of Bremen, ¹¹⁵¹_{B. 3, H. 1, 2, '95} describe a curette the shaft of which follows in outline the shape of the tongue, thus facilitating its use in the removal of growths in the glosso-epiglottic space.

Kronenberg, ⁴⁷⁵_{No. 77} writing on the subject of the lingual tonsil, states that general treatment should be directed toward such conditions as syphilis, scrofula, neurasthenia, and chlorosis. Local treatment in slight cases may consist of astringent gargling (a few drops of tincture of myrrh or of rhatany in a wineglassful of water) and brushing with a glycerin solution of iodine, with or without carbolic acid, nitrate-of-silver solution 10 to 20 per cent., or pyroligneous vinegar and menthol 50 per cent., resorcin, etc. Individual swollen follicles can be destroyed by means of fused chromic acid, solid nitrate of silver, or trichloroacetic acid. In more pronounced hypertrophy the galvano-caustic point or flat burner or snare may be employed, and in suitable cases the cold snare or a special tonsillotome, with or without the superaddition of the scissors. Recurrence is frequent, but should be combated by means of iodine.

Closely connected with inflammation of the lingual tonsil is sublingual phlegmon, of which Henri Blanc, of Paris, ¹¹_{Nov. 30, '95} reports two cases accompanied by serious general phenomena and tendency to asphyxia. They were deep phlegmons of the buccal floor, resembling Ludwig's angina in the great gravity of the symptoms and their infectious aspect, and cured by a simple operation, the diseased area being attacked in the median line through the suprahyoid region. The author advises intervention as early as possible in these cases.

PHARYNX.

Acute and Phlegmonous Pharyngitis.

S. Wimberg ²⁰⁰⁰_{'95} gives a description of pneumococcic angina, studied for the first time by Jaccoud. ²¹²_{Mar. '91} The clinical aspect is similar to that of diphtheria,—fever, adenopathy, and large and extensive membranes on the fauces and upon the tonsils. The bacteriological examination indicates the presence of the pneumococcus alone instead of Lœffler's bacillus. One symptom is, nevertheless, characteristic,—the suddenness of the diffusion of angina and violent chill, as in pneumonia. Eight observations and one original case are described by the author.

Raymond Petit ³⁶³_{Feb. 2, 5, '95} has been led to regard the sore throat of menstruation as due to streptococci. It is generally benign, but may terminate in the formation of an abscess or give rise to facial

erysipelas. He is of the opinion that women during menstruation should guard against infection by the use of antiseptic linen and by particular care of the mouth. Woman, during all her genital periods (menstruation, labor), affords a specially favorable soil for the development of the streptococcus.

S. von Stein, of Moscow, ³¹²_{Oct., '94} reports the first recorded case of acute phlegmonous pharyngitis complicated by purulent meningitis. The case described by the author is probably, to judge from the pathological examination, identical with the morbid condition described by Senator ⁴_{Jan. 30, '88} under the name of "acute primary infectious phlegmon of the pharynx," and which has also been observed by others. The author's case differs, first, in the absence of hæmorrhagic gastritis, and in the direction of the purulent infiltration, which extended not downward toward the region of the neck, but upward toward the face, naso-pharyngeal space, and brain. The pathological diagnosis furnished by the post-mortem examination was deep, phlegmonous pharyngitis, circumscribed purulent leptomeningitis, and abscess of the left temporal lobe of the brain.

Ch. Rocaz ²⁵_{Oct., '94} reports a case of general infection by the streptococcus, in a child of 1 year, following catarrhal angina. R. Troquart ¹⁸⁸_{June 9, '96} reports two cases of adenophlegmon of the neck following angina.

Garel ³⁷_{Feb., '95; Apr. 20} describes a form of pharyngitis which indicates the presence of diabetes or albuminuria. There are two forms of pharyngitis associated with these diseases,—namely, the hyperæmic and anæmic; these appear to the author to be two stages of the same disease. In the dry or anæmic form the mucous membrane may be of somewhat a grayish appearance, granular, often traversed by small vessels. It is only the hyperæmic form which presents characteristic features. Sugar or albumin is then almost invariably found in the urine, whereas in dry pharyngitis they are only present in one-eighth of the cases. In this hyperæmic pharyngitis there is discomfort in the throat, trouble in swallowing saliva, and the pharyngeal mucous membrane is swollen, hypersensitive, and with excess of secretion. The voice is often a little husky. In 21 such cases the author found sugar in 10 and albumin in 11. In the former the age varied from 40 to 50; in the latter from 28 to 75. As regards the amount of sugar present, the state of the throat gave no indication, but the albuminuria, except in one case, was always slight. The author concludes that this hyperæmic pharyngitis may be considered as the first indication of diabetes or albuminuria. It is almost pathognomonic.

Chronic Pharyngitis.

Hamon du Fougeray ³⁷_{Aug., '95} recommends menthol in the treatment of this disease, regarding it as a drug which is harmless in the patient's hands, and which possesses anæsthetic and antiseptic properties. The following formula is prescribed by him:—

R Menthol, 1 part.
Vaselin or sweet almond-oil, 10 parts.

To be applied two or three times daily with an ordinary water-color brush into each nostril, bending the patient's head backward. Then with a larger brush the pharynx is freely swabbed. Mentholated oil may likewise be used in nasal, pharyngeal, or retropharyngeal sprays. The effects of menthol are surprising.

Membranous Pharyngitis.

Landonzy, of Paris, ¹⁰_{July 30, '95} in a communication to the Academy of Medicine, on the bacteriological diagnosis of angina, calls attention to the necessity of revising the nosography of anginas. He bases his assertions on 860 bacteriological examinations, of which 42.32 per cent. showed the presence of Lœffler's bacillus only and 57.68 per cent. showed other bacilli. The importance of bacteriological examination is so great that it is imperative in case of membranous angina. At the present time more errors are made with respect to diphtheria than to any other angina. The streptococcus, the staphylococcus, the Brison coccus, or the pneumococcus may assume the same appearance as that of diphtheria, and no clinical sign permits an affirmation as to the nature of an angina. Notwithstanding the clearest symptomatology (grayish pseudomembranes reforming with rapidity, glands but little swollen, and slight fever), it is impossible to affirm the presence of diphtheria. Bacteriological examination often reveals a streptococcic or pneumococcic infection. On the other hand, greatly swollen glands and throat, the latter having a spotted, yellowish appearance, give rise to hesitation, and bacteriological examination shows the presence of Eberth's bacillus and of the streptococcus.

E. Meyer ⁴_{Jan. 21, '95} reports an infection occurring in a number of persons and due to a common origin. On the 6th of February 28 persons dined together in a hotel. One of the landlord's children was suffering from diphtheria, from which he died four days later. On the 9th of February 8 of the 28 guests were attacked by membranous pharyngitis, which in 5 cases was limited to follicular tonsillitis without any other complication, while in the 3 other cases it showed itself in the form of an attack of severe

diphtheria, 2 of the patients dying on the fourth and tenth days, respectively. Meyer examined bacteriologically two of the guests, a little girl and her brother, aged 13 years, suffering from membranous pharyngitis. In the first he found only Löffler's bacilli and in the second the same bacilli associated with streptococci. A gentleman who had supped the same evening in another room of the restaurant fell ill on the 9th of February and died on the fourth day afterward. Here it is seen that in the 9 patients the duration of the incubation lasted exactly seventy-two hours.

Darbonet³_{Dec., '94} obtained excellent results from local applications of guaiacol in phlegmonous pharyngitis and tonsillitis. Instead of using pure guaiacol, as has been recommended, he prefers it mixed with glycerin in equal parts for adults, and 1 part of guaiacol to 2 parts of glycerin for children. Care should always be taken to shake the bottle containing the mixture before swabbing out the throat, as guaiacol and glycerin do not mix thoroughly. The first sensation experienced by the patient is one of burning and pain, together with the disagreeable taste of the drug. These effects, however, rapidly give place to a peculiar sensation of well-being, of freshness in the throat, and swallowing is no longer painful, while the fever rapidly diminishes.

Syphilis of the Pharynx.

Scanes Spicer⁶_{Oct 27, '94} showed before the Harveian Society a case of perforation and cicatrization of the palate from congenital syphilis in a girl aged 10½ years. The throat had been in that state for two years. He called attention to the unusually early age at which she presented these advanced palatal lesions and the comparative rarity with which they resulted from congenital and hereditary disease, and he thought that the condition arose from deep, painless, and unnoticed ulceration rather than from the breaking down of a gumma.

Von Genser³_{May 29, '95} showed before the Imperial and Royal Society of Medicine a child, 3 months old, suffering from hereditary syphilis with perforation of the palate. At birth the child showed no signs of syphilis; three weeks previously a running from the nose had appeared and fifteen days previously an exanthema had developed.

But two cases of perforation of the palate in children suffering from hereditary syphilis are recorded.

P. Mermet¹⁰⁰_{Mar. 12, '95} describes the case of a young man, 17 years of age, with secondary manifestations of syphilis in the mouth and pharynx—angina and pharyngitis—two months after the primary chancre.

A very interesting case of syphilitic cicatricial adhesion of the tongue to the palate and pharyngeal walls is reported by E. Larue Vansant, of Philadelphia.⁹
Dec. 1, '94 The tongue was found bound to the internal surface of the gums and to the roof of the mouth by a thick cicatrix, which extended across the dorsum of the tongue opposite the back molar teeth. A little to the left of the centre of this cicatrix there was a small circular opening three-eighths of an inch in diameter. Passing a probe through this opening it was found that a narrow canal, some three inches long, ran somewhat diagonally from left to right, and communicated with the pharynx to the right of the epiglottis. This canal was so constricted at points that an ordinary grooved director of a pocket-case could barely be passed through it. Upon examining the nasal cavities they were found to be free and in fairly normal condition. A probe passed through the nostrils would meet an obstruction in the pharynx and could not be carried lower. The patient was unable to breathe through the nose, and the only channel for nourishment and respiration was the narrow canal before mentioned. The author calls attention to the fact that, subsequent to two operations performed to separate the united parts, the time necessary to replace and reunite the cicatricial tissue was about the same after each operation,—namely, from six to eight weeks,—and this, notwithstanding the great difference in the extent and character of the operations. In fact, the contraction began as soon as the process of repair from the operations commenced. The necessity for a long-continued after-treatment in such cases is thus made forcibly evident.

P. Heymann²²
Mar. 20, '95 read a paper, before the Society for Internal Medicine of Berlin, on adhesions and stenoses of the pharynx and larynx as a consequence of syphilis, based on twenty years' experience as a specialist in this department. There were two spots in the naso-pharyngeal space, immediately behind the choanæ and on the border near the oro-pharyngeal space, in which the adhesions, which were always the termination of gummatous ulcers, were observed. Larger cicatricial formations were always circular. The extent and importance of the adhesions varied greatly from complete closure to such as scarcely interfered with the function of the parts. Near the attachments at the border perforations were frequently present, and in this way the connection between the upper and lower pharyngeal space was maintained. Although the proper oro-pharyngeal space was free from adhesions, he had observed membranous adhesions on the level of the root of the tongue, just above the epiglottis, in 6 cases. Openings were always present in the occluding membrane. In 2 cases the

dyspnœa was so great that tracheotomy had to be performed, and food was always partaken of under great difficulties. The structure forming the occlusion was a thick membranous mass that was separated with difficulty, and was not at all vascular. Its thickness was varied. In 3 of the 6 cases this was the only manifestation of syphilis present.

Lieven³⁴_{No. 21, '95; Dec.} describes the following method of operation in cases in which syphilitic lesions of the throat have been followed by adhesion between the soft palate and the wall of the pharynx. After cutting the palate free, as well as all bands of adhesion, the posterior nares are powdered with euprophen and packed with euprophen gauze for ten days. A rubber bag, like a colpeurynter, is then introduced for several hours daily at first, and later less frequently. The bag is put in position by attaching the tube to a soft catheter, which is passed through the nose into the throat. When in position the bag is distended with air. In very old cases of extensive destruction of the posterior wall of the pharynx and wasting of the pharyngeal muscles and those of the palate, it would be better not to operate, as it can benefit the patient but little.

Pel¹¹_{June, '95} expressed the opinion, before the Dutch Laryngological, Rhinological, and Otological Society, that, in ulcerative processes in the mouth and throat, even with a negative result from specific treatment, the greatest precaution is necessary in regard to diagnosis. He had treated a girl with extensive destructive process in the mouth and pharynx, in whom, after the continued use of large doses of iodine, the diagnosis of tuberculosis was established, but in whom, at a later period, a few mercurial injections brought about a striking recovery with extensive cicatrization. Sikkel remarked that the opposite had also been observed,—namely, that, where mercury had failed, iodide of potassium brought about recovery. He recommended alternate treatment with both remedies.

Tuberculosis of the Pharynx.

Kiaer³⁷⁵_{No. 52, '94} describes in detail three interesting cases, and concludes that this condition, though rare, is more common than syphilis of the œsophagus and stomach. It is very rare in children, being most common in adult males. In none of the three cases quoted was there any evidence of the ulceration having begun on the sides of the pharynx, and from thence spread to the posterior wall and the soft palate, which is said by Mackenzie to be the usual course. The author thinks that there is strong evidence in favor of all three cases being primary; the rapid and extensive

local changes, compared with the comparatively recent ones found in the lungs, point to this. In the two adult cases the first symptoms were those of dysphagia, and in the child the mucous membranes of both pharynx and larynx appeared to be simultaneously affected, although in this case the dysphagia was never so extreme as in the others.

Cases of tuberculosis of the pharynx were also reported by E. Harrison Griffin, of New York, ¹_{Feb 16, '95} and W. Porter. ⁶⁶³_{Nov., '94} In the former's case the family history was unique. Her grandfather was alive, aged 75 years; her grandmother alive, aged 80 years; her father alive; her mother had died of typhoid fever at 32 years of age; there was no history of consumption in the family. An examination of the sputum showed the tubercle bacilli in large numbers. The case made rapid progress toward a fatal end, thus conforming to the usual history of these cases: the nearer the air the tubercle bacillus is ingrafted, the quicker the death of the patient,—generally within four months after the primary inoculation.

Walter, of Charlottenburg. ¹¹⁶_{No. 2, '95}; ¹¹_{June, '95} reports a rare case of tuberculous ulcer of the palate. The patient, 38 years old, affected with tuberculosis of the lungs and larynx, complained that when he swallowed fluids they escaped by the nose. Examination showed a perforation of the hard palate, through which the antrum of Highmore could be seen. The wall of the ulcer was covered with miliary tubercles. The ulcer followed the extraction of a carious tooth. The patient died a short time afterward. In literature the author only found two similar observations,—published by Kustner and Réthi.

Pharyngomycosis.

Siebenmann ¹¹⁵¹_{B. 2, H. 3} has examined the whitish or grayish-white masses which characterize this affection histologically, either in place with the fragment of tonsil on which they were localized or isolated. He noted an exceedingly well marked corneous transformation of the epithelium of the tonsillar follicles. This keratosis is frequent under a rudimentary form. The presence of leptothrix is secondary and the term of "pharyngeal mycosis" should, in his opinion, be rejected.

John Dunn ⁸¹_{July, '95} records a case of pharyngomycosis in which it seemed impossible to prevent recurrence. The patient was taken ill with pleuro-pneumonia, and examination afterward showed that there were present no signs of the former mycosis. Not one mycotic mass could be seen. The large number of these masses existing in the throat at the time he was taken ill with

pleuro-pneumonia had, without local treatment, all disappeared. This observation tends to give weight to the hypothesis that pharyngeal leptothrix mycosis occurs over the adenoid areas of the throat, the secretions of the mucous membranes of which have become changed as the result of impairment of the general health.

J. Wright, of New York, ¹_{July 6, '95} quotes four illustrative cases of this disease, the last being one of affection of the nose and naso-pharynx. He considers the galvano-cautery of no avail, except in the tonsil, and thinks that most cases end in spontaneous recovery.

Percepid, ³⁷_{Jan., '95} in an article on benign mycosis of the pharynx and its treatment, states that the best actual treatment is that of Wagner, by means of chromic acid. The acid is melted on the extremity of a pharyngeal probe, a bright-red bead being obtained. With this bead of acid each mycotic spot is touched, avoiding all contact with the healthy portions of the mucous membrane; the mycotic spot becomes yellow. A second application should be made eight days afterward.

Retropharyngeal Abscess.

H. Koplik, of New York, ⁵⁰_{Sept. 26, '94; Nov. 27, '94} has met with sixty cases during seven years and considers the disease as one capable of suddenly attacking children previously in perfect health. An infant suddenly refuses the breast; next its voice is noticed to be of a snuffling, metallic tone. Inspection now reveals a median or lateral swelling pushing forward the posterior pharyngeal wall, or nothing may be visible; but palpation reveals a swelling or fluctuation about the level of the epiglottis or deeper. Swallowing may be made difficult or impossible; sometimes even the breathing is disturbed. Three methods were used for obtaining the pus: (1) incision by way of the mouth; (2) aspiration through the mouth; (3) a lateral opening in the neck. The utmost antiseptic precautions were taken; but in any case the first method could not be entirely freed from objection. Four species of streptococci were made out, and, after Lingelsheim, classed as long streptococcus *a* of the pharynx, long ditto *b*, short *a*, and short *b*. All gave the bouillon an acid reaction after varying periods. All took a blue stain and formed more or less long and intricate coccic chains. No very decided reaction followed the injection of each species into rabbits and mice. Hence Koplik concludes that the streptococci are mild in character, two especially—short *b* and long *b*—being non-pathogenic.

George P. Biggs ⁵⁹_{Aug. 31, '95} showed to the New York Pathological Society specimens from a case of retropharyngeal abscess. The

patient, a child 18 months of age, had been a coroner's case in which the diagnosis had been made of diphtheria. At the autopsy, however, nothing had been found except slight parenchymatous change in the organs, until the larynx had been reached. On removing this organ, considerable pus had escaped from the retropharyngeal region, and examination then had shown the cavity of a retropharyngeal abscess, about three centimetres in diameter. There had been no rupture of the abscess during life. The mucous membrane of the pharynx, tonsils, and larynx was normal and there was no evidence of diphtheria. Death had been apparently due to the projection forward of the pharyngeal abscess and the consequent occlusion of the rima glottidis.

Samuel K. Bremner, of Mt. Vernon, New York, ⁵¹_{Mar., '96} states that, at the autopsy of a case of retropharyngeal abscess in a 3-month-old infant, examination showed that the abscess-pocket contained about 2 ounces (62 grammes) of thick, yellow pus, and extended from a point high up beneath the post-pharyngeal wall, dissecting down behind the œsophagus as far as fourth rib. The length was four and one-half inches and average width one inch. The lungs were moderately congested, the other organs normal. It is interesting to note that there was no dysphagia; the child nursed well almost to the time of death. There was no swelling in the post-pharynx and no external evidence of the condition found on autopsy.

Jacques L. Reverdin, of Geneva, ¹⁹⁷_{Feb., '96} gives an account of three cases caused by Pott's disease and opened by Burckhardt's method. He affirms that this operation is easy and is indicated not only for cold or tuberculous abscesses, but also for septic suppurations due to the presence of foreign bodies—such as one described by Burckhardt—and even, except in cases of urgency, for the so-called idiopathic acute abscesses, because it affords a better guarantee against infection.

E. Escat ¹¹⁵³_{June 16, '96} after a consideration of anatomical relations of the aponeurosis of the naso-pharyngeal cavity and the retropharyngeal space, concludes that incision by the pharynx is the method to be preferred in acute retropharyngeal abscess; it is contra-indicated in prevertebral and lateropharyngeal abscesses. Cutaneous incision at the posterior border of the sterno-mastoid muscle should be reserved for exceptional cases of cervical propagation of acute retropharyngeal abscesses, for acute lateropharyngeal abscesses, and for cold prevertebral abscesses.

Piatot ¹¹³⁹_{July 11, '96; Sept., '96} reports a case in which a child, aged 14 months, suffering from a large retropharyngeal abscess, died sud-

denly on an incision being made into it. There was no œdema of the glottis. Death is believed to have been due to syncope of reflex origin, though the exact mechanism was not apparent. The pneumogastric nerves were, however, pushed back and stretched by the abscess. The case is recorded so that operators may be on their guard against such an accident, which the author, however, sees no way of preventing.

R. Meslay¹¹_{Apr., '95} reports a case of abscess of the maxillo-pharyngeal region, with ulceration of the internal carotid and rupture of the abscess in the pharynx and the external auditory meatus. At the necropsy blood was found in the stomach and bowels. The abscess of the submaxillary region was found to be due to a suppurative adenitis. No inflammation of the middle ear existed, nor perforation of the tympanum.

Tumors of Pharynx.

To show the possibility of the spontaneous recovery from pharyngeal and naso-pharyngeal tumors, A. d'Aguanno^{624 673}_{Oct., '94; July, '95} relates two interesting cases, the first of a boy, 3 years old, who had such a large growth in the naso-pharynx that tracheotomy was recommended in order to prevent death by suffocation. The parents objected to the operation, and, although the symptoms increased in severity, the child afterward improved, and after a lapse of three years perfectly recovered, every trace of the tumor having disappeared. The second case was that of a child, 13 years old, who, from microscopical examination, was found to have a telangiectasic fibrosarcoma of the naso-pharynx. After a severe hæmorrhage the growth diminished in size and the child's health improved, but two years later it was again as large as before.

Lymphosarcoma.—Stoerk, of Vienna,⁸⁴_{Sept. 29 to Oct. 27, '94} in an article on lymphosarcoma of the pharynx and larynx, states that the diagnosis appears so difficult in the initial stage that it is not likely to be made, the affection being usually confounded with syphilitic, epitheliomatous, or adenoid growths, while the patients usually present themselves for examination only when the growth has begun to ulcerate. From a study of numerous cases recognized by histological examination and followed with care Stoerk concludes that there are, however, some signs enabling an early clinical diagnosis to be made, such as the age of the patient, the extreme hardness of the growth, and the inefficiency of mercurial or iodide treatment.

Chiari¹³⁶_{Feb. 1, '95} states that the diagnosis is easy if prolonged observation is possible. The changes—ulceration and resorption of the neoplasm—are characteristic. At the onset a confusion with

sypilis is easy. Histological examination is often decisive, especially at first. As to treatment, he advises arsenic and palliative surgical measures.

Malignant Growths.—Ribbert ²¹⁴_{Feb.1,'95} reports a case of tumor of the pharynx in an old man, the growth being in the invisible portion of the throat and often giving rise to attacks of suffocation, which could be relieved by drinking water. Finally a tumor appeared at the level of the left lobe of the thyroid gland. At autopsy there was found on the left wall of the pharynx, at the level of the orifice of the larynx, a tumor the size of a nut, with a short pedicle and a smooth mucous surface. It was a pavement-epithelium cancer. The cervical tumor, as large as a hen's egg, was formed by a degenerated gland.

Cases of pharyngeal malignant growths are also reported by William Hill, ¹¹_{July,'95} and W. Posthumus Meyjes, of Amsterdam. ¹¹_{June,'95}

Angioma.—P. McBride, of Edinburgh, ¹¹_{May,'95} reports a case of venous angioma of the pharynx, consisting of tolerably large veins and occupying the whole palatal margin from the uvula, inclusive of the left side. Smaller separate patches were seen on the anterior and posterior pillars of the fauces, while a bluish tinge was communicated to the anterior portion of the soft palate of the corresponding side. As the tumor produced no symptoms, it was not intended to apply any treatment.

Moure ¹⁸⁸_{June 30,'95} showed to the Society of Medicine and Surgery of Bordeaux a patient, aged 38 years, suffering from congenital angioma of the isthmus of the fauces, extending as far as the much-everted mucous membrane of the left ventricle of Morgagni. As the patient experienced no discomfort or functional disturbance, no operation was required. Moure showed the case as a pathological curiosity.

L. Lichtwitz ⁷⁰_{Apr.7,'95} observed in the pharynx of a girl of 16 years a dark-brown tumor, bluish in spots, without pulsations, located behind the left tonsil, and implanted on a broad base. The posterior wall of the pharynx showed a black and irregular spot, over which extended a large, dilated vein. No hæmorrhage or discomfort had ever existed in the throat. Some pigmentary nævi were present on the face.

Fibroma.—Ficano ⁶²⁴_{No.5,'95} reports a case of fibroma of the posterior wall of the pharynx, following an attack of angina in a woman 30 years old. The tumor, at first exceedingly minute, soon began to grow in such a way as to interfere with deglutition and respiration, and in two months reached the size of a pigeon's egg. Its removal by a cold-wire snare was followed by definite recovery. Histological examination showed it to be a fibroma.

Lipoma.—Roe ⁸¹⁴_{Nov.1,'94} reports a case of fibrolipoma of the pharynx. This variety of pharyngeal tumors is the rarest of all occurring in the pharynx. The author's patient was a woman, aged 49 years, whose throat revealed a large swelling projecting forward from the posterior pharyngeal wall, nearly filling the pharynx. It extended vertically from a point opposite the base of the uvula to a point opposite the arytenoid cartilages, and laterally from one posterior pillar to the other. This enlargement was somewhat ovoid in shape, the larger portion being above and covered with mucous membrane, indicating the existence of a growth located behind the pharyngeal wall. On palpation this swelling had a soft, doughy feeling, similar to that of an abscess, but the history and appearance gave no suspicion that this swelling was of that character. Nor did administration of antispasmodic remedies effect any change. The attachment of the growth extended from a point opposite the base of the uvula to a point opposite the arytenoid cartilages. Careful dissection was necessary to remove this attachment from the vertebræ.

Aneurism.—Rosenthal ¹³⁶_{Dec.15,'95} reports a case of aneurism of the pharynx. The patient suffered from a pulsatile tumor of the size of a coffee-bean, located at the origin of the pharyngo-palatine pillar. By compressing the right carotid the pulsation could be stopped. Rosenthal attributes much importance to these aneurisms in operations, especially in amygdalotomy.

A case of false traumatic aneurism of the descending palatine artery is reported by Uhl. ³⁴_{May 21,'96}

Pharyngotomy.

Jeremitsch ²²⁶_{B.49,'96} ⁸¹⁴_{Aug.15} reports a case of voluntary suprahoid pharyngotomy,—an attempted suicide by cutting the throat. The wound lay immediately above the hyoid bone and opened the pharynx so widely that in coughing the epiglottis projected. The wound was drawn together with two rows of sutures, with drainage-tubes in the angles, and primary union was obtained. Jeremitsch claims that this method of approaching the pharynx presents many advantages and could be easily imitated by the surgeon. In particular, it gives very free access, and the results of the wound treatment in this case show that it could be easily closed.

Rosenbaum ⁹⁹_{Oct.24,'96} performed total extirpation of the epiglottis by subhyoidan pharyngotomy. According to this author, there have thus far been published only three cases of total extirpation of the epiglottis,—those of Burow, Schulten, and Krönlein. The success of Israel's operation, from a functional point of view, has

brought into prominence the fact that the epiglottis is not indispensable to the normal act of deglutition, which is sufficiently insured by the reflex closure of the glottis and the movement which at the moment of deglutition carries the larynx upward and forward under the base of the tongue.

Foreign Bodies in the Pharynx.

F. Semon, of London, ⁹⁰_{Apr., '95} in the course of some practical remarks on foreign bodies in the upper air- and food- passages, lays down, as the principles which should guide the practitioner in laryngeal and œsophageal cases, that (1) no foreign body, the presence of which has been actually detected, ought to be allowed to remain impacted, even if at the time it does not produce any serious symptoms; (2) no attempt should be made to ram an angular or pointed body down forcibly. The author relates several unpublished cases illustrating the importance of the above rules, concluding with a case which illustrates the necessity of receiving a patient's own history with caution.

Ramon Castaneda, of St. Sebastian, ⁶³²_{Mar. 9, '95} states that in cases of foreign body in the pharynx great prudence should be used, and the finger should not be blindly introduced into the throat when it is possible to employ reflecting and lighting instruments, which enable the exact location of the foreign body to be made. Castaneda believes that the habit of giving bread-crumbs in these cases should be abandoned. If the foreign body is of some size the bread-crumbs will be arrested and form a collection above it, thus doubling the difficulty of freeing the œsophagus.

TONSILS.

Acute Tonsillitis.

Massei, of Naples, ⁷⁷_{Aug., '95} discusses the clinical differences between the various forms of membranous tonsillitis. In the first place, if the patient cannot open the mouth diphtheria may almost invariably be excluded, and one of the inflammatory non-diphtheritic forms of angina suspected. If the affection is a single manifestation without any erythematous or papular eruption, diphtheria is to be suspected; if on the second, third, or fourth day of scarlet fever, the angina is probably coccogenic, and not bacillary. In the presence of a yellowish-white, separable membrane affecting chiefly the tonsils, one should suspect staphylococci alone or in conjunction with streptococci. If the exudation is thicker, more compact, grayish white, and developed not only on the tonsil, but on the uvula as well, or if the membrane is sur-

rounded by a well-marked hyperæmic zone, it is probably of streptococcic origin. If the exudation is very white, compact, and dense, it is probably due to pneumococci; if the pseudomembrane has the character of a compact, fixed, dense tissue, more or less thick, it is most likely due to staphylococci alone. These are, of course, purely clinical methods of diagnosis, where bacteriological examination is not obtainable. Menstruation, dyspepsia, etc., and other so-called causes of tonsillitis only act as a pathway for the pathogenic organism. Massei recommends strongly sublimate gargles (1 in 1000), ice, cocaine, and Behring's serum for the doubtfully diphtheritic cases.

Panas, of Paris, ³_{Jan. 23, '95} reports a case of bilateral dacryoadenitis secondary to tonsillitis. The case was that of a young man, 25 years old, admitted into the hospital for bilateral dacryoadenitis. One month before he had had bilateral acute tonsillitis with enlargement of the cervical glands. Fever and adynamia lasted six days. Three weeks later tumefaction of the lids occurred, the lachrymal secretion was exaggerated, and little by little inflammation of the lachrymal glands appeared. The tonsils were now again enlarged, red, and presented purulent discharges. There was nasal, muco-purulent, bilateral discharge, in which was found, by cultures and bacteriological examinations, virulent streptococci and staphylococci. The author thinks that lachrymal inflammation is directly connected with infectious disease of the nose and tonsils.

George B. Hope, of New York, ¹¹_{Aug., '95} in a paper read before the American Laryngological Association, takes the ground that the theory of acute tonsillitis, very generally attributed to an underlying rheumatic or gouty diathesis, is not substantiated by clinical observation, believing that the accepted version is largely due to the natural disposition to fall into line with time-honored views and unconsidered general statements. He asserts that patients subject to attacks of tonsillitis do not commonly afford a history of rheumatism proximate or remote, while, on the other hand, the rheumatic individual rarely suffers from inflammation of the tonsils; that it is noteworthy that the tonsil in later life becomes less and less disposed to acute attacks, while the rheumatic age is more confirmed. Furthermore, as a local acute manifestation, rheumatism should select a sero-fibrous rather than a muco-fibrous or lymphatic structure like the tonsil. Carrying the argument farther, he claims that suppurative peritonsillitis is clearly of an infectious nature, and is frequently a sequela of intra-nasal operations quite independent of climatic or constitutional conditions.

W. E. Taylor, of San Francisco, Cal.,⁷⁷_{Oct., '94} reports a case of œdema of the larynx due to acute tonsillitis. Laryngotomy was followed by pleuro-pneumonia, for which aspiration of the chest was performed, recovery then taking place.

Josias, of Paris,³⁷_{Dec., '94} reports a case in which the use of salol during an attack of acute tonsillitis gave rise to complications. The case was that of a girl, 18 years old, suffering from acute tonsillitis, who took internally 1 gramme (15½ grains) of salol the first day and 2 grammes (31 grains) on the following day. A large patch of scarlatiniform erythema showed itself on the right thigh, rubecolic macules on the left thigh, and papules on the cheeks. The urine presented the characteristic reactions of carbolic and salicylic acids. This case should be added to those noted by Cartaz and Morel-Lavallée. Robert Boyd, of Philadelphia,⁵⁹_{Feb. 2, '95} also reports a case of tonsillitis complicated with erythema.

Follicular Tonsillitis.

B. Fraenkel, of Berlin,¹¹_{Aug., '95} calls attention to the fact that the clinical phenomena of this disease are clearly those of an infectious fever, while microscopical examination reveals the signs of inflammation of the parenchyma, with increased transudation of leucocytes, and the presence of micro-organisms in the tissues. Only really simple cases are of service in studying the etiology. Such cases occur as sequelæ of intra-nasal operations, and here there is no room for doubt but that micro-organisms are carried by the lymph-vessels to the tonsils, access being gained by way of the intra-nasal lesion. The presence of micro-organisms is an essential factor in the causation of the disease, but these can penetrate and become actively pathogenic only when some influence detrimental to the organism is also present. Chill possibly may act as a factor by causing rhinitis and so opening the door to micro-organisms which are normally excluded.

F. Semon, of London,²_{Oct. 26, '95} alluded to the ever-growing importance of the tonsils as the prominent portal of entrance for the most various pathogenic micro-organisms and explains this as being due to the physiological gaps of the covering epithelium, which are large enough to give easy passage to emigrating leucocytes and to immigrating microbes.

Lennox Browne, of London,²_{Oct. 26, '95} agrees with the statement of Fraenkel that lacunar tonsillitis sometimes follows intra-nasal operations, and draws attention to the fact that it occurs more frequently when the galvano-cautery is used than when the operation is a cutting or sawing one for the removal of a spur, the explanation probably being that for a certain time the filtering functions

of the nose are abrogated, and that some, at least, of the innumerable organisms of an innocent character which are found in the nasal passages are stimulated into virulence. The accident is a comparatively rare one and as liable to produce acute median otitis as an acute lacunar tonsillitis.

Moritz Schmidt, of Frankfort-on-the-Main, ²_{Oct. 26, '96} states that he has met with lacunar tonsillitis after intra-nasal operations in only 1 per cent. of his cases. He cannot attribute this to his antiseptic precautions, for he does not rely very greatly on them in the nose. Perhaps it is due to the bactericidal properties of the nasal mucus.

Gleitsmann, of New York, ²_{Oct. 26, '96} expresses some doubt as to the origin of tonsillitis. It is not due to septic instruments or cautery points, nor to the subsequent swelling and obstruction after intra-nasal cautery, for it has occurred with perfectly patent nostrils; the effects of the cautery he restrains by the application of trichloroacetic acid.

Macintyre, of Glasgow, ²_{Oct. 26, '96} maintains that, while there are strong grounds for believing that lacunar tonsillitis and many such acute affections of the throat are due to microbic causes, the requirements of Koch, before accepting anything as definitely proved, have not been demonstrated in any series of experiments of which he knows. Until these are forthcoming he prefers to say that, viewed clinically, pathologically, or from bacteriological investigations, there are strong presumptions that we are dealing with pathogenic organisms in this affection.

Treatment.—J. Mount Bleyer, of New York, ⁷¹_{Feb., '96} publishes an additional report showing the specific action of nuclein in follicular tonsillitis. Of thirty-five cases of different grades of severity all recovered in twenty-four hours from the time of beginning treatment by nuclein injections.

Lewis C. Cline ⁸²_{Dec. 22, '94} states that follicular concretions predispose to attacks of quinsy and are the cause of the majority of these cases, and that they can be permanently cured by carefully searching for and destroying all the crypts and pockets in which these bodies are formed.

James B. Ball ¹⁵_{Dec., '94} recommends in chronic lacunar tonsillitis the use of a small hook-bladed knife to unite contiguous follicles and thereby encourage them to eject their contents. To prevent rapid closure the author paints a solution of 90 grains (6 grammes) each of iodine and iodide of potassium in 1 ounce (31 cubic centimetres) of water over the surface. Emptying the crypts and applying caustic without incision does not prove so satisfactory as this method.

Ulcerative Tonsillitis.

Mendel, of Paris, ³⁷_{June, '95} states that the tonsillar, chancre-like ulceration may show itself under exceedingly varied aspects and give rise to difficulty in the diagnosis. The syphilitic chancre is a grayish ulcer, with indurated base and borders and glandular enlargement. The pseudochancre is also indurated and unilateral, but of shorter duration and characterized by a less intense glandular enlargement. Ulcerative tonsillitis runs an almost painless and apyretic course; it is, possibly, herpes of the tonsil, the vesicular stage of which has passed unnoticed.

Helme suggested that Garel's sign—that any pharyngeal dysphagia lasting three weeks should lead to the suspicion of syphilis—was of value in this connection. Poyet had observed similar cases resembling tertiary manifestations, and improved by the iodides. Moure stated that the chancre is distinguished from such ulcerative lesions by its special aspect and by its being always accompanied by acute symptoms. In herpes the dissemination and rapid recovery of the lesions suffice for the diagnosis; on the other hand, tertiary symptoms are frequently exceedingly difficult to recognize. Ulcerations like those described by Mendel must be of lacunar origin. Castex stated that its differentiation from an ulcerated epithelioma is frequently very difficult.

Moure, of Bordeaux, ¹³⁶_{Sept. 15, '95} has noticed these deep, punched-out ulcers resembling syphilis, especially in the spring and autumn, and in persons of from 20 to 30 years of age, often medical students. Although undoubtedly of microbic origin, the author has not been able to discover any bacillus which he considers the cause of the disease.

[The character of the breath and the facies peculiar to syphilitics are at times of assistance in establishing a diagnosis. In these cases the ulcer presents, here and there, a dentated edge and an irregular, shallow, horizontal, groove-like excavation, causing the upper edge of the ulceration to slightly overhang. This would tend to suggest that the ulcerative process is mainly active on a level with the bottom of the ulcer. The pseudosyphilitic ulcer is less irregular in outline and its edges are less ragged.—C. E. S.]

Hypertrophy of Tonsils.

Price Brown ³⁹_{Dec. 15, '94} reports a case of severe hæmorrhage after tonsillotomy, and sums up the recorded cases. He was able to find, including his own, 64 instances. Of these, 3 were children aged, respectively, 6, 8, and 10 years. In 2 of them hæmorrhage did not occur until four and four and a half days after operation. In the other, although commencing early, it did not cease until

five days after excision of the tonsil. In 61 cases, all adults, with 3 or 4 exceptions the hæmorrhage occurred, at the outside, within two days after tonsillotomy. In the exceptional cases the hæmorrhage could be traced individually to overexertion of one form or another.

Ingals, of Chicago, ¹¹⁷⁰_{Aug., '95} has found bleeding more common in children whose tonsils are not large at the time of operation, but in whom removal seems indicated. In his experience, cocaine does not anæsthetize and it promotes bleeding.

In the discussion, Daly, of Pittsburgh, stated that he had had four or five alarming cases of hæmorrhage. Shurly, of Detroit, had had two hæmorrhages in children, and believes that the operator should always be prepared for an abnormal distribution of vessels. He does not follow the crypts in ignipuncture, but endeavors to burn diagonally to them, thereby crossing the lymph-spaces and endeavoring to replace a fibroid induration by a process of contraction. Casselberry never operates without having a reliable galvano-cautery at hand to use, if necessary, as an hæmostatic. In fibrous tonsils he prefers the galvano-cautery snare. It is difficult to separate the faucial pillars; but, if he can get their muscular fibres free, he does not mind the sacrifice of a little mucous membrane.

C. G. Kenyon ¹⁴⁷_{Nov., '94} reports a severe case of hæmorrhage following the removal with scissors of a tonsil from an adult. Digital compression was tried without satisfactory results. An hæmorrhoidal forceps was next applied about the stump of the tonsil and a ligature placed above it.

[The chances of hæmorrhage may be greatly reduced by means of a few preliminary stabs with the galvano-cautery broad knife at bright cherry-red heat. An imaginary perpendicular line is drawn as close to the base of the tonsils as the pillars will permit and the knife is deeply inserted two or three times, the cuts following the axis of the imaginary line. The secondary contraction limits the lumen of the larger vessels and occludes many small ones. Three weeks later the tonsils may be amputated.—C. E. S.]

Intense dyspnœa after excision of the tonsils was observed in a case operated by George Walker, of Yorkville, South Carolina. ⁹_{Dec. 8, '94} The head was lowered and artificial breathing begun. In a short time the respiration came back, but labored, and continued thus for about forty minutes and again ceased, the patient being apparently dead. By continuing the artificial respiration and telling her in a loud voice to breathe, breathing was finally established. The author thinks the trouble was caused either by irritation of the respiratory

nerves or by the toxic action of cocaine, most probably the latter. As stated, only a 4-per-cent. solution was applied by means of an atomizer. None was injected, and the woman was directed to swallow none.

[The trouble was, doubtless, due to the cocaine. I have observed a similar case in a physician. The thoracic muscles seem to bear the brunt of the paralyzing influence of the drug. If the patient can be urged to assist by voluntarily going through the act of breathing about eighteen times a minute, the dangerous period is safely passed. The atomizer should be avoided when a cocaine solution is to be applied.—C. E. S.]

Arthur Ames Bliss ⁸⁰_{Mar., '95} ⁶⁷³_{May} discusses the subject of excision of the tonsils, calling attention to a type of hypertrophied and diseased tonsil in which the tonsillotome cannot surround the mass to be excised, but simply presses against the free surface. He has had the best results from the use of a scissors adapted from Teet's nasal cutting forceps, in conjunction with Farnham's crocodile-jaw forceps. The special features of the scissors are its long, powerful handles; the relatively short, strong blades, and a socket into which the shank of the lower blade falls as the scissors closes. This socket arrangement presses the blades together and prevents them from being sprung apart when cutting through thickened tissue. The two instruments—forceps and scissors—readily serve as a tongue-depressor while the operator is at work; but in trimming out tonsils under cocaine the patient can, of course, assist by holding the tongue-depressor himself, when one is required. Upon adults this can be done without ether, a 5-per-cent. solution of cocaine, applied on pledgets, being sufficient to cause local anæsthesia. He has frequently been able to use this method with quite young children, but where post-nasal adenoids exist he completes the post-nasal and faucial operation at the same time under ether.

J. W. Farlow, of Boston, ¹¹⁷⁰_{Aug., '95} ¹_{Nov. 9} advocates removal of the tonsils by means of a cold-wire snare, the ordinary polypus-snare being too light and frail. By means of a heavier instrument, specially devised for this purpose by him, with cannula straight from the handle, and furnished with piano-wire, Nos. 5 and 7, which is fastened securely by means of pins, any tonsil, however large and dense, can be removed with a rapidity varying according to the pleasure of the operator. Hæmorrhage does not ensue from this method, but one objection is that it causes greater pain. The pain can be reduced materially by the use of ice before and after the operation, in addition to the ordinary applications of cocaine. The method by the cold-wire snare has been advocated

for many years by Bosworth, and has been tried quite extensively. It is to be preferred when the patient can be anæsthetized, as in children about to undergo operation for both tonsils and adenoids, and may be selected for adults not anæsthetized who can stand a little pain, and whose tonsils, from their size and density, would seem likely to bleed.

[The cold snare causes severe pain, especially when the tonsils are hard.—C. E. S.]

Tumors of Tonsils.

Lymphadenoma.—Cartaz ¹⁴_{May 8, '95} stated to the French Society of Laryngology that he had observed two cases of lymphadenomata of the tonsils in patients about 60 years old. In both there was glandular enlargement in the neck, axillæ, and groin; the spleen was not enlarged.

In the first case arsenic in large doses (Fowler's solution gradually increased to 35 drops daily) caused diminution in size of the tonsils. Death occurred three years later. The second case was that of a woman in whom symptoms of suffocation led to removal of one of the tonsils. The symptoms increased and the patient died five weeks later.

As has already been noted, the affection began in the left tonsil and spread rapidly to the other. The singular insomnia from which the patient suffered should be noted, and Cartaz wishes to call special attention to the fact that as operation in these cases seem to increase the symptoms, it should only be performed when suffocation is threatened. The only treatment to be recommended is arsenic in large doses. In the discussion Beausoleil ¹⁴_{May 8, '95} reported one case, the specimens of which were shown to the Anatomical Society of Bordeaux, in which Moure was obliged to remove a portion of the tonsil. The operation was followed by serious symptoms and death very rapidly supervened. Joseph F. Gibb ¹¹⁹_{May 25, '96} reports a case of lymphoma of the tonsil.

Lipoma.—Onodi ¹³⁶_{July 15, '95} states that up to the present time lipomata have not been observed in the tonsil. He now reports a case in a child, the tumor being situated on the left tonsil. It was light yellow, one centimetre long, one-half centimetre wide, and pedunculated, and was removed with the polypotome. Examination showed that it was formed of fat, and was consequently a lipoma.

Papilloma.—Another extremely rare form of tumor is papilloma of the tonsils, a case of which is recorded by H. T. Machell, of Toronto, Canada. ¹_{Jan. 19, '96} The tonsils were rough and ragged in appearance at first glance. On closer inspection, however, the

rough appearance was seen to be made up of numberless papillæ or pedunculated masses, packed closely together and extending downward as far as one could see or feel with the finger. They also bulged so far forward as to hide the uvula completely and rest on the base of the tongue. There was very little sensation in them, and, bulging as far forward as they did, there was no difficulty in palpating them. Each papilloma seemed to have a separate and distinct entity. Some had a very small pedicle, others larger, but none sessile. So large and closely packed were these papillæ that one could not help wondering at her being able to swallow at all. While she could swallow fluids if taken very slowly, there was always difficulty in the deglutition of solids. The solid particles appeared to get tangled up in the papillæ and would only pass on down after repeated efforts at swallowing. Before any treatment was adopted the patient was taken ill and died within forty-eight hours of probable scarlatina. Some of the interesting points were: 1. The presence of a lipoma of the neck at 4 years of age and its difficult removal. 2. Goitre at 7 years. 3. Papilloma of the tonsils, first noticed at 8 years,—that is, two years before entering hospital, thus showing slow growth.

Sarcoma.—W. Charnley³²_{Jan., '95} reports a case of lymphosarcoma of the tonsils with repeated removals followed by very rapid recurrence. The growth, a lymphosarcoma the size of a tangerine orange, was removed three times in as many months; the original tumor had a very narrow pedicle. E. Lanphear, of St. Louis,¹_{Aug. 3, '95}¹¹_{Nov.} reports two fatal cases of sarcoma of the tonsil, with death from ligation of the carotid in one. Gorham Bacon¹_{Aug. 31, '95} records a case of sarcoma of the neck involving the tonsil and causing deafness in a boy 7 years of age. Cases of sarcoma of the tonsil are reported by Roswell Park, of Buffalo,¹⁷⁰_{Feb., '95} and Verrall.⁶_{Oct. 13, '94} F. T. Chamberlin, of Washington, D. C.,⁸¹_{June, '95} treated a case of round-celled sarcoma by erysipelas and prodigious toxins after excision. The patient was greatly improved. Tauber, of Warsaw,⁵⁸⁶_{Nov. 15, 16, '95} describes a case of primary sarcoma of the tonsil, removed by lateral pharyngotomy, with recovery.

Syphilis of the Tonsil.

Fournier, of Paris,¹⁴_{Jan. 30, Feb. 3, '95}²_{Mar. 16} states that syphilitic ulcer of the tonsil ranks third among the ulcers of the mouth, he having recognized it in 40 per cent. of his cases. The sore is generally single and covers the whole tonsillar surface, occasionally extending to the pillars of the fauces and base of the tongue. The right tonsil is said to be affected more frequently than the left. The erosive form is the most common, giving rise to few symp-

toms or signs,—only slight redness, swelling, and superficial erosion of the tonsil. The ulcerative form causes more decided disturbances,—pain, dysphagia; reddish-brown, gray, or yellowish ulcers; with considerable induration of the whole tonsil. The anginal form is the least frequent and shows itself as a tonsillitis with ulceration, much pain and dysphagia, and some general disturbance of the system. In addition to these three forms, or rather graver developments of the same, a diphtheritic and a gangrenous form are met with in rare cases. In the differential diagnosis of these ulcers, as well as the initial syphilosclerosis of the tonsil without ulceration, the chief points to bear in mind are the character of the associated adenopathy, the persistency and one-sidedness of the lesion, and the time of appearance and course of the disease. Benign cases usually last about five weeks; graver forms may continue for two months or more.

According to Dieulafoy, of Paris, ³_{Apr. 3, '95} the differential diagnosis between chancre and epithelioma of the tonsil is very difficult, the appearance of the lesions being identical, and engorged glands as well as pain being present. A certain number of distinguishing symptoms exist, however; in the chancre glandular enlargement generally occurs earlier than in epithelioma, a cancer the size of a chancre as yet showing no adenopathy, while retro-maxillary adenitis is characteristic of chancre. Finally, chancre tends to heal and cancer to extend.

J. Sendziak, of Warsaw, ¹³⁶_{No. 9, '96} ⁵_{Aug.} reports an extraordinary case of syphilis of the tonsils which for several weeks had been regarded as one of diphtheria, then as, perhaps, an example of fibrinous angina or of a new form of mycosis, and finally as a sarcoma. After a prolonged continuance the antisiphilitic test was applied in treatment, with the result of promptly clearing up the diagnosis by curing the case. Three weeks after the commencement of the disease the right tonsil was enlarged in its vertical diameter to such an extent as considerably to occlude the isthmus of the throat. It was entirely covered with a white membrane, slightly bluish, thick and lardaceous, and incapable of separation from the parenchyma of the tonsil. The total aspect was that of a tonsil which had been entirely covered with the products of a topical application of silver nitrate in substance. The writer cites a case of supposed cancer of the larynx sent to Wiesbaden for laryngectomy, in which specific treatment suggested by B. Fraenkel completely cured a syphilitic laryngitis.

Cases of chancre of the tonsil are reported by Henry B. Hitz, of Milwaukee, Wis. ⁵⁹_{Sept. 28, '96}; B. Wolff, of Atlanta, Ga., ⁸¹_{Nov., '94} and T. C. Evans, of Louisville, Ky. ²¹⁵_{Oct., '95}

LARYNX.

Anatomy and Physiology.

Centre of Phonation.—Klemperer¹¹⁵¹_{B.2,H.3,'95} corroborates and extends the earlier researches of Krause, Semon, and Horsley. He not only extirpated the centres to find that the operation had no effect whatever on the mobility of the vocal cords, but, even after induced infection of the centres by the injection of typhus-bacilli cultures (evoking thus an acute septic irritation), found that there was no implication of function whatever. Risien Russell¹⁶⁶_{Oct., '95} contributes a paper demonstrating the actual existence of centres for ab- and ad-duction of the cords, though he, too, was not able to produce isolated movements of the opposite vocal cord by stimulation of the corresponding areas in the opposite hemisphere.

J. Broeckaert¹¹⁶⁰_{June 27, '95} gives the result of his experimental researches on this subject. - Unilateral irritation of Krause's centres by means of mild induced currents causes adduction of the vocal cords. Bilateral extirpation of these same centres causes abolition of barking in the dog, but the reflex adduction of the cords is preserved, the animal continuing to cry and to perform all the reflex acts of phonation of which he is capable. The laryngeal nerves remain intact, proving that all the fibres taking part in the adduction of the vocal cords come from the medullary centre, and not directly from the cortical centre. The abolition of barking persists for some weeks, when, insensibly, the power returns, the animal beginning to bark as when he first learned. It is probable that the centre is reproduced from the neighboring parts, and, through the law of contiguity in time and space, it unites with the other centres taking part in the complex act of barking. The centre of Krause is not the only one concerned in it, but is simply the centre of active adduction of the vocal cords.

Onodi, of Budapest,¹¹_{Jan., '95} has been able to localize a region whose preservation makes phonation and adduction still possible, and which lies with the posterior corpora quadrigemina at the uppermost part of the fourth ventricle for a length of eight millimetres. The upper limit of this region is the furrow separating the anterior from the posterior quadrigemina. The lower one is a plane drawn eight millimetres below and behind this furrow. When this region is left intact phonation and adduction continue, and even when its connection with the brain and the basal ganglia has been severed; on the other hand, phonation and adduction cease when the downward connections of this patch are cut through. In the last case the abduction movements of the vocal cords depend upon the automatic function of the vagus nucleus.

In the discussion of Onodi's paper, Réthi, of Vienna, stated that the phonation-centre acts in an analogous way with the centres for chewing and swallowing. These functions have also their associations with both hemispheres, and he was able to follow the fibres from the cortex downward to the internal capsule and the subthalamie region. In this last region there lay the co-ordination centre for chewing and swallowing. If this is cut off, only simple contractions of the muscles of mastication, and without co-ordination, can be excited from the transverse section.

The posterior corpora bigemina as centres of hearing, phonation, and special movement were studied by Bechterew,²⁴²_{Nov., '95} who experimented upon rabbits, guinea-pigs, and white rats, reaching the following conclusions: 1. If the destruction of both posterior corpora bigemina were sufficiently thorough, a more or less marked diminution of hearing or complete deafness followed. Superficial destruction of the gray masses mentioned did not have any noticeable influence upon the sense of hearing of the animals. 2. Where the ablation had been sufficient, it was noticed that, besides the impairment of the sense of hearing, a weakening or even complete cessation of the voice was the consequence. Unilateral ablation caused only weakening of the voice. Superficial ablation had no effect upon it. 3. After thorough ablation of the posterior corpora bigemina the animals lose the faculty of standing and gait, although otherwise the motility of the extremities is preserved.

The symptoms observed during the first hours after the lesions of the posterior corpora bigemina were: staggering gait, forced movements or forced positions, sometimes manege movements with deviation of the eyes, lying upon one side of the body, turning of the head, occasionally nystagmus, etc. Similar motor disturbances, only in a reversed sense had been observed after excitation of the posterior corpora bigemina. Although the existence of a cortical centre for the voice has been claimed and described by Krause, Semon, Horsley, and Masini, the author found that there is no spot in the cortex whose destruction would have any influence on the voice. Transverse (frontal) sections of the brain anywhere cephalad from the corpora bigemina produce no alteration of the voice; when the section is made caudad from the corpora bigemina posterior, the voice ceases altogether.

The author does not believe that the effect upon the voice and the other motor disturbances observed as sequelæ to ablation of the posterior corpora bigemina are due to lesion of deeper-lying structures,—for instance, of the superior cerebellar peduncles,—but is convinced that the posterior corpora bigemina are themselves the centres for said movements.

Heymann, of Berlin, ¹¹⁵¹_{B.3.H.1.2,'95} presented before the South German Laryngological Society at Heidelberg preparations of the epithelium of the true vocal cords. By the advice and assistance of C. Benda, of Berlin, he succeeded, by maceration in diluted acetic acid, in loosening the epithelium in such a way that it could be removed in pieces and be examined through the microscope as a bird's eye view. The forms described by Coyne and B. Fraenkel appeared clearly, running in part parallel to one another, in part inclined obliquely to one another, often cutting across each other. The papilla-like formations at the intersections may in part be due to this arrangement of the epithelium and in part may be caused by section.

B. Fraenkel ¹¹_{Oct., '95} claims priority in the study of this subject, and states that every part of the vocal cords is characterized in a measure by the arrangement of the fibres. In consequence of increased fibrous tissue and thickened epithelium an instantaneous alteration to pachyderma results. The carcinoma-buds are destructive to the fibres; they form atypical buds. The same author ¹³⁶_{Jan. 1, '95} proves, from the literature on the subject, that the so-called cartilages of Wrisberg should not bear that name, as Camper had already described them with accuracy before Wrisberg. He proposes the term "cuneiform cartilages."

Laryngitis.

Felix Semon, of London, ¹¹_{Sept., '95} alluded to the confusion which at present exists in the nomenclature of and to the probable pathological identity of the various forms of acute septic inflammations of the throat, hitherto described as acute œdema of the larynx, œdematous laryngitis, erysipelas of the pharynx and larynx, phlegmon of the pharynx and larynx, and angina Ludovici, these various forms of acute septic inflammation of the throat and neck merely representing degrees varying in virulence of one and the same process. In his opinion, their primary localization and subsequent development depends, in all probability, upon accidental breaches of the protecting surface through which the pathogenic micro-organism which causes the subsequent events finds an entrance; and he concludes that it is positively impossible to draw at any point a definite line of demarkation between the purely local and the more complicated or between the œdematous and the purulent forms. De Havilland Hall said that the result of his experience for the past seventeen years led him to assert that erysipelas of the larynx, phlegmonous pharyngitis, and angina Ludovici were so similar that the slight difference in their starting-point was not a sufficient reason for making a different classification

necessary. He recorded seven cases. All these presented much the same clinical picture, and he regarded them all, therefore, as identical.

Butlin, of London, contended that in the diseases proposed to be classed as identical very few bacteriological examinations had been made, and very few inoculation experiments performed. He quoted observations to show that no less than ten microbes might produce the same pathological condition, and that ten conditions might be the result of the action of one microbe.

Dundas Grant thought that much good would result from this simple modification in the classification of these diseases suggested by Semon. His own experience tended in the same direction. Of the affections thus grouped together typical angina Ludovici was the one least likely to be pathologically identical with the rest, since he had seen it secondary to disease of the teeth and also of the ears.

Arthur Kuttner, of Berlin, ²⁰_{Jan. 4, '96} concludes that acute submucous laryngitis may be of primary or secondary origin or of a non-infectious origin, induced by violence, burns, neighboring lesions, or constitutional affections (tuberculosis and syphilis). In both cases three stages in the evolution of the laryngitis are distinguished: the œdematous stage; erysipelas of the larynx,—that is, plastic and suppurative stages; infectious phlegmon.

Œdema of the larynx comprises all cases in which the œdema is a consequence of another local or general process; no inflammatory reaction is present; the etiological factors include Bright's disease, cardiac affections, venous stasis, anæmia, and general hydræmia and angioneurotic processes.

Tuberculosis of the Larynx.

At the meeting of American Laryngological Association Jonathan Wright ⁵⁹_{July 20, '96} opened the discussion of tuberculosis of the larynx by a consideration of the etiology, stating that recent bacteriological progress has led us to modify very largely the literal interpretation of Koch's postulates regarding the relations of germs to disease. We now know that bacteria can get through epithelium and in some instances they seem to be destroyed by phagocytosis. It is believed possible that the lymphoid tissue at the base of the tongue may become inoculated by tubercular material taken in as food. It is conjectural, however, as to whether the bacilli found here are really in the tissues or in the superficial papillæ. We can inject tuberculous material into animals and kill them, but the Pravaz syringe does not exactly meet the requirements of clinical medicine. We all get a dosage of

tubercle bacilli sooner or later, and one in every seven falls. Autopsies reveal, in one out of every two or three, evidences of arrested tuberculosis. The mortality is due not so much to the bacillus as to the bad general environment under which men live. Physicians, as a class, are not particularly liable to tubercular disease, though exposed most constantly thereto. Children fed on the milk of Alderney cows suffer especially.

The scanty anastomosis between the external and internal lymphatics about the neck explains perhaps why so many escape, but in the nose the abundant communication of the lymph-channels with those of the subarachnoid space may account for the frequency in children of tubercular meningitis. The protection of the larynx is also very remarkable. We have abandoned Louis's theory of corrosive sputa, but many patients are either not examined or the tubercular deposit escapes observation, or the tubercular ulcers are seen only when the patient is *in extremis*. Out of twenty-five cases examined, Wright found nasal or throat tuberculosis in only four. As we clinically see the disease, the pyogenic cocci may first make a breach in the epithelium, through which the bacillus enters. The latter cannot produce an abscess. It is doubtful whether it can penetrate glandular epithelium or not.

Sections of the laryngeal mucosa of newborn children show that it has a wavy outline, especially in the interarytenoid space. Under vocal strain this wavy, columnar epithelium stretches, and so exercises a protective influence over the deeper laryngeal structures. Nasal tuberculosis in phthisis generally comes toward the end of the disease, as does that of the pharynx, though the latter is possible in the earlier stages of acute miliary tuberculosis.

Richard Lake, ⁵_{Apr., '95} in a contribution to the pathology of laryngeal phthisis, suggests that the micrococci, being at rest on the epithelial surface between the attacks of coughing, and especially during sleep, may find their way into the interstices between the cells. Some are removed by phagocytes; others, by reason of their numbers, succeed in establishing themselves and, by destroying cells and phagocytes, form a small abscess. The abscess ruptures and is still—bacteriologically speaking—non-tubercular. The ulceration continues, and, as the abscess increases in depth, the risk of infection by Koch's bacillus increases, and by the time the submucous tissue is reached, if not earlier, this infection certainly occurs.

Ulceration is not the first symptom of laryngeal invasion; the presence of other micro-organisms in the sputum probably increases the risk of laryngeal invasion. If by intertracheal

medication the bacteria can be rendered harmless, the larynx will be favorably influenced.

Rice, of New York, ⁶⁷³_{Sept., '96} states that 80 per cent. of all cases of laryngeal phthisis can be easily diagnosed, but that great care needs to be exercised in the remaining 20 per cent. Of this latter proportion perhaps one-half cannot be definitely diagnosed without the aid of the iodides and the microscope. In ordinary cases nothing can be more typical than the semi-œdematous, semi-inflammatory swelling of the tubercular infiltrations and the superficial "moth-eaten" ulcer, which follows, with its gray surface.

Treatment.—At the same meeting, J. W. Gleitsmann, of New York, stated that curettement should be regarded as analogous to excision. It removes the focus of infection, which is a constant drain upon an already-debilitated system, and is, in properly-selected cases, more effective, quicker, and better in result than any other procedure. Besides, the infiltration of the arytenoid region, which is the great cause of dysphagia, can often be removed at one sitting by the double curette. Healing is prompt and cicatrization rapid. Moreover, the suffering of patients due to abundant nerve-proliferation justifies arytenoidectomy. Even in active pulmonary disease with hectic, diminution of dysphagia means more nourishment taken and a consequent improvement in the general condition. Additional advantages gained are improvement in voice, cough, and respiration. The indications are: 1. Primary tubercular disease without lung complication. 2. Cases with concomitant lung disease, either incipient or which has stopped short of softening or hectic. 3. Especially circumscribed ulcerations and infiltrations. 4. Dense, hard swelling of the arytenoid region, ventricular band, posterior wall, tuberculous tumors, and affections of the epiglottis. 5. Advanced lung disease with distressing dysphagia from arytenoid infiltration. The contra-indications are: 1. Advanced pulmonary disease and hectic fever. 2. Disseminated tubercular disease of the larynx, leaving little or no area of healthy tissue. 3. Extensive infiltration producing stenosis. Here tracheotomy is indicated. Heryng's single curettes are best suited for cleaning and scraping of ulcerations, and Krause's double curettes and Heryng's rotary curettes for excision of tubercular infiltration. Subglottic lesions can be operated upon with Scheinmann's forceps, and an attempt may be made to reach the ventricles of the larynx with laterally-bent forceps. Absolute quiet is necessary after operation, and until cicatrization is complete daily applications should be made of lactic acid and pyoktanin (1 or 2 per cent.). Cicatrization occurs in from seven to twenty-eight days. Ulcerations which are well defined do better

than if shallow and extended. Dense infiltrations (which are generally localized) do better than œdematous conditions.

T. Morris Murray, of Washington, D. C., curetted a case two weeks before the patient's death. The ulcer had healed and the patient's last days had been rendered much more comfortable. One of his cases, operated five years before, had remained healed.

Ingals, of Chicago, thought that of one thousand cases operated on and one thousand cases treated topically, the latter series would show more cures than the former. He had had four recoveries from laryngeal and pharyngeal ulcerations by simply rubbing in lactic acid without previous scraping. In the deeper cases we should curette, as it was of doubtful propriety to cut away large masses of tissue.

Daly had seen some laryngeal cases recover under diet, inhalations, and especially iodoform, with which he saturates the patient.

Wright expressed his skepticism as to the treatment of laryngeal tuberculosis. There is not but one single etiological factor, there are many; while laryngeal tuberculosis may give no symptoms whatever, even when the erosive process has invaded the cartilage. The cases reported cured have been limited to the first stage of the disease. Very few cases are suitable for Krause's and Heryng's methods.

In a discussion on the surgical treatment of laryngeal tuberculosis, before the British Medical Association, Krause²²_{July 31, '98} stated that in all cases where tuberculous ulcers are complicated with advanced infiltration or granulations surgical treatment is necessary. Simple ulcers are those surrounded by only slight infiltration, and these are best treated by lactic acid. High fever and weakness form no absolute contra-indication to the operation, because in such difficult cases relief is often obtained to the dysphagia or difficulty of respiration. In several observed cases the laryngeal troubles had disappeared entirely after the operation up to the time of death from the pulmonary lesions. It was evident that, in spite of the cure of the larynx, the disease in the lungs would probably run its course. Relapses did occur, but since the introduction of surgical treatment more rarely in the larynx than in the lungs.

In the discussion, Theodore Heryng, of Warsaw, remarked that tubercle of the larynx might heal spontaneously, chiefly in cases of ulceration of the vocal cords and posterior wall, more rarely the more serious cases with infiltration and deep ulceration or implicating the cartilage, or accompanied with aphonia and

severe dysphagia leading to rapid disintegration. The most important indication in the general treatment of these cases is removal of the dysphagia and relief of the dyspnoea. The cure of deep ulcers with inflamed and thickened bases, surrounded by proliferation products, and certain cases of chronic laryngeal tuberculosis, is most quickly and certainly effected by surgical means. It is desirable to remove as much of the affected parts as possible at each sitting, after having freely applied cocaine. The chances of the treatment proving successful are in proportion to the local character of the disease, its extent and character, the general state of the patient's health, the thoroughness of the operation, and the after-treatment. Most patients with laryngeal phthisis die of pulmonary phthisis, and many of the temporarily cured cases are liable to recurrence. In rare cases complete cure has been obtained, and even partial cures have often proved lasting. In any case the dysphagia, the dysphonia, and the dyspnoea can be relieved. Luc, of Paris, agreed that if such cases cannot be cured by these means they are, at any rate, greatly relieved. This is especially the case when there is enormous swelling in the arytenoid region, preventing swallowing. By extirpating these tumors they could thoroughly change the condition of the patient for the better. He had had severe hæmorrhage in operating on a tubercular epiglottis, but the fact was he had cut too deeply. This patient had since gained ten pounds in weight and reported himself in good health. Delavan, of New York, spoke strongly in favor of this operation and regretted that his fellow-practitioners in New York would not listen to any proposal to adopt this procedure, probably because they were unaware of the admirable results that had been obtained. He pointed out, however, that operations which were well borne by sufferers in one part of the world were ill borne by others of a more highly nervous temperament. Lennox Browne, of London, said that he had derived so much benefit from curetting followed by the application of lactic acid that he was quite willing to go farther, but patients and their friends did not take kindly to the idea of the surgical treatment of laryngeal phthisis. De Roaldes, of New Orleans, did not think surgical intervention necessary in all cases, and urged a careful choice of cases. The operations proposed were, in any event, not justifiable until milder measures had been tried and had failed.

In summing up the treatment of laryngeal tuberculosis, Levy, of New York, ^{July 20, '96} contends that, whether we accept the surgical and lactic-acid treatment for their curative effects or not, the judicious application of these substances not infrequently affords great relief to the patient. Instances have occurred in which

cocaine, morphine, and a variety of palliatives offered no relief whatever, but in which the application to the ulcerations of a 50-per-cent. solution of lactic acid rendered the patients extremely comfortable so far as pain was concerned. Even heroic curettement has given some patients complete relief from pain in swallowing food after the immediate effect of the operation had subsided. He considers, therefore, as the best palliative at our command a judicious application of lactic acid and curettement or both combined.

Hajek ¹⁶⁹_{H.2,p.65,'95; June} ⁵ believes that thorough cleansing is important in order to limit the action of irritating sputum. Carbolic acid in from 1- to 3-per-cent. solution in glycerin, balsam of Peru, creasote in inhalation, menthol in 20-per-cent. solution in olive-oil or glycerin, iodoform and iodol in insufflation—all locally applied—are valuable. Lactic acid also is of use, but cures very seldom result.

W. F. Chappell, of New York, ¹_{Mar.30,'95} advocates local sub-mucous injections of creasote, using the following formula:—

R Creasote,	1 to 2 drachms (4 to 8 grammes).
Castor-oil,	3 drachms (12.00 grammes)
Oil of gaultheria,	3 drachms (12.00 grammes).
Oil of hydrocarbon,	1 drachm (4.00 grammes)
Menthol,	10 grains (0.65 gramme).

Before applying this the larynx is thoroughly cleansed and a 10-per-cent. solution of cocaine applied. In the ulcerative stages he recommends a spray of a solution of creasote 1 drachm (4 grammes) to the ounce (31 grammes), and he also gives sub-mucous injections. To facilitate this method he has devised an automatic laryngeal syringe, which, having been “set” before insertion of the point into the tissues of the larynx, makes the injection automatically through the action of a spring. It is claimed that this is an advantage because the undesirable vibration of an instrument made by pressing a piston home with the thumb is avoided.

Spengler, of St. Petersburg, ¹¹⁰¹_{v.4,No.1,'95} shows that parachlorphenol has considerable effect on tubercle bacilli in laryngeal phthisis when locally applied. After having observed its action by experiments on animals, he treats twenty-six cases, ten of whom appeared to be completely cured. The parachlorphenol was mixed with glycerin in various proportions, and when applied to the ulcerations on the mucous membrane of the larynx was found not only to cause no irritation, but to have a soothing effect as well as a cicatrizing action, the soothing effect being much more prolonged than that obtained by the use of cocaine.

The use of creolin inunctions in laryngeal tuberculosis is

considered by Shadewald, ⁴_{No. 24, '96} who reports the case of a patient, with limited pulmonary tuberculosis, upon whom he demonstrated two healed and one existing ulcers of the larynx. He had made use of good (not old) cresol (orthocresol), the total amount employed being about 7 ounces (217 grammes), which was energetically rubbed into the body, each application lasting from fifteen to twenty minutes. It is well, in his opinion, to incorporate lanolin with it to prevent adhesions to the linen, which would cause cutaneous irritation. During the treatment the ulceration disappeared.

J. A. Thompson, of Cincinnati, ⁸¹⁴_{Jan. 15, '96} ⁹⁰_{Apr., '96} reports three cases of laryngeal tuberculosis in which the local application of a 5-per-cent. solution of monochlorophenol produced palliative results. He considers that this drug had a marked anæsthetic effect, diminishing pain and cough and allowing the patients to swallow their food much more freely. Monochlorophenol is carbolic acid with one atom of hydrogen replaced by chlorine. It is a colorless, volatile, oily liquid with a rather offensive odor. It is miscible with the light petroleum-oils and freely with glycerin.

H. W. Loeb, of St. Louis, ⁶¹_{Sept. 21, '96} reports nine cases of laryngeal tuberculosis, seven of which had been treated with Paquin's anti-tuberculous serum. The patients all greatly improved. One case particularly was relieved of dysphagia, pain in the larynx, cough, and night-sweats. Other patients showed a much greater improvement than under any other plan of treatment yet tried.

Ricardo Botey, of Barcelona, ⁴⁵⁶_{Nov. 25, '96} recommends lacto-carbolized glycerin in laryngeal tuberculosis. This is an emollient liquid more easily applied to the mucous membranes and remaining more localized and adherent than an aqueous solution. It does not evaporate, as does an aqueous and especially an alcoholic solution, the latter soon becoming more concentrated than when first applied. It takes up water and consequently relieves the congestion of the mucous membranes, at the same time causing the irritating properties of carbolic and lactic acids to disappear in some as yet unexplained manner, while in no way diminishing their caustic and antiseptic action. It is a perfect solvent of both medicinal substances. The author begins by using the following formula:—

R Natural glycerin,	20 grammes (5 drachms).
Carbolic acid,	1 gramme (15 minims).
Lactic acid,	2 grammes (30 minims).

Gradually, as the tolerance of the patient increases, the solution is increased in strength,—the two acids are increased twofold to fivefold. Five years' experience enabled Botey to conclude that

lactophenated glycerin is by all means the best topical agent in laryngeal tuberculosis, even when compared with sulphuricinated phenol, and in practice it really gives more positive results than the latter agent.

Cases of recovery are reported by J. W. Gleitsmann, of New York, ¹¹ obtained by means of Krause's method, and A. Rosenberg, of Berlin, ⁴ ⁶ presented a case of cured laryngeal tuberculosis before the Berlin Medical Society, the latter's patient being treated with injections of menthol in oil, and later on in the same year appeared to be cured. An examination nearly eight years afterward confirms this, scars being seen in the position of the old ulceration. The cure is the more remarkable, as the patient is a poor private teacher, who has not been able to rest his larynx properly.

Harris ¹¹ ^{Sept., '95} reported to the New York Academy of Medicine a case of tuberculous laryngitis with recovery in a woman 68 years old. The curette was first used, followed by an application of lactic acid, but without any benefit. A similar result followed the use of iodoform and a solution of silver nitrate. The region was then again curetted and pure ichthyol applied, with an almost immediate favorable response. There were a number of recurrences, but since the first of last November there has been no return of the ulcerations. The woman to-day is in very good health. She has no trouble whatever in swallowing.

Symonds ¹¹ ^{May, '95} described to the London Laryngological Society a case of tubercular ulceration of the epiglottis, successfully treated by curetting and lactic acid. In the discussion Clifford Beale referred to the occasional occurrence of spontaneous healing of localized tubercle of the epiglottis without any special treatment. Butlin mentioned the case of a boy with destructive ulceration of the epiglottis, which healed completely under the simple application of iodoform. McBride quoted a case of spontaneous cure, in which the pharynx had been affected with a pale-bluish œdema similar to that seen in the larynx in tubercular cases. Lactic acid was applied, but not very regularly, and the swelling disappeared. No bacilli were found in the case.

Paul Bergengrün ¹¹⁵¹ ^{B. J. H. 2, '94} states that he has obtained a recovery in seven cases of laryngeal tuberculosis. The author outlines the general method employed in these cases. The first indication is to improve the general health, and for this he advises, above all, residence in the country. As regards the local lesion, a primary indication is to insure the repose of the organs by requesting him to use his voice as little as possible. The most active local drugs are lactic acid and iodoform or its succedaneum,—iodol. Curet-

tage of the larynx may be useful, but is not indispensable. He has abandoned the use of tuberculin, although he does not doubt that it is efficacious in certain cases. In one of his patients, particularly, the effect was quite marked. Creasote, which is looked upon as a panacea, causes digestive disturbances, and Berengr n has not employed it systematically.

Syphilis of the Larynx.

Clarence C. Rice¹¹_{Sept., '95} states that, while, if there is any doubt as to the character of a lesion, a thorough trial of the iodides should be given in order to exclude syphilis, it should be borne in mind that some cases of a non-specific nature are benefited by potassium iodide, particularly when the drug is given in small doses, and even malignant neoplasms may show temporary improvement under its use. Delavan¹¹_{Sept., '95} confirms the assertion that the drug may produce a temporary improvement in malignant cases and for a time mask their true nature.

Robinson¹¹_{Sept., '95} maintains that, while in many doubtful cases of laryngeal disease potassium iodide is of unquestionable benefit, it is also true that in some cases of laryngitis, with a certain amount of stenosis and dyspno a, unless we are very careful in administering potassium iodide we may produce very unpleasant effects. The dyspno a may be increased and the inflammatory action aggravated.

Polyak¹³⁶_{Feb. 1, '95} reports a case of laryngeal stenosis produced by a gumma. A. Irsai¹³⁶_{Feb. 1, '95} states that he has observed several cases of stenosis consequent on syphilitic perichondritis, and that he had endeavored, instead of performing tracheotomy, to make intramuscular injections of corrosive sublimate in doses of 0.05 gramme ($\frac{7}{8}$ grain) according to Lukasievich's method. The injections were made once a week, with exceedingly good results, the stenosis improving shortly after the first injection and the patient breathing freely after the second.

Laryngeal Stenosis.

E. Kraus, of Paris,¹⁰⁸_{Feb. 15, '95} reports a case of complicated laryngeal stenosis of nervous origin. Purely hysterical disturbances are not uncommon in laryngology; their diagnosis is easy and their interest small; but this is not true of mixed cases, and the one described by him seems interesting from more than one point of view. The laryngeal symptoms were evidently of double origin,—hysterical and diphtheritic. The paralysis of the right vocal cord, of diphtheritic origin, was evidently the efficient cause of the adductor spasms of the left cord through the liability to

hysterical spasm presented by the patient. The combination of these two kinds of symptoms had given rise to a tenacious and disturbing laryngeal stenosis which resisted every kind of treatment and constantly increased in intensity. The result obtained by hypnotic treatment proved *a posteriori* the exactness of the diagnosis, for the hysterical symptoms disappeared, while the paralysis, of diphtheritic origin, was in no way improved and remained, at the time of report, what it was at the onset of the symptoms.

Corrado Corradi, of Verona, ³⁷_{Sept., '96} in an article on stenoses of the larynx, describes a new method of dilatation, which is as follows: Tracheotomy having been performed and a cannula with a large enough opening at its superior extremity inserted, an English bougie is passed, entering by the tracheal opening and coming out through the mouth. To the extremity of the bougie is fastened a thread, which is also drawn out through the mouth. To the lower end of the thread is fastened a laminaria cylinder, to the lower end of which also is attached a safety thread. When the cylinder is in the larynx, the cannula is placed in position and the thread just referred to drawn out through the orifice of the cannula. In this way the cylindrical laminaria is kept in position by the traction thread passing through the mouth and below by the other thread coming out through the tracheal opening. The author states that he has had good results from this method, and he proposes to try it in adhesions of the soft palate to the posterior wall of the pharynx.

Bayer, ⁸⁶⁸_{July 29, '96} in a contribution on the relations existing in woman between the sexual system and laryngeal affections, reported a case of laryngeal stenosis in a tuberculous woman disappearing after miscarriage. The patient, aged 34, presented pronounced symptoms of laryngeal stenosis (dyspnœa, aphonia, cough, sputa, swelling of the inferior extremities, etc.; in fact, the type of advanced tuberculosis). Examination showed an ulcerating tubercular laryngitis, with swelling of the epiglottis, arytenoid, and the interior of the larynx; so that the glottic opening was reduced to a narrow slit and tracheotomy was seriously thought of. The woman was three months pregnant and aborted. Eight days later the laryngeal inflammation was nearly gone and all necessity for operative interference had passed away. The final result is not stated.

Herpes of the Larynx.

A. Brindel, of Bordeaux, ¹³⁶_{Mar. 15, '96} states that herpes of the larynx is to be regarded only as one of the localizations of herpetic fever, its most frequent seat being on the posterior surface of the epi-

glottis and the region of the arytenoids. It is characterized by the evolution of herpetic vesicles surrounded by an inflammatory zone. The symptoms are those of herpetic fever, upon one side, and odynphagia, dysphonia, and possibly dyspnœa, on the other. The invasion is sudden, the progress rapid, the prognosis good, recovery complete, and recurrence possible. In rare instances, if ever, herpes of the larynx is accompanied by symptoms analogous to those of croup. The subject is also reviewed by Secrétan, of Lausanne. ³⁷
Aug., '95

Foreign Bodies in the Larynx.

E. de Pradel, ¹⁵²
Apr. 5, '95 reports an instance of pseudo-whooping-cough due to a foreign body (a small pebble) in the larynx in a child 5 years old. The cough and vomiting were absolutely characteristic. The diagnosis was confirmed in hospital, where the child was taken for consultation. Notwithstanding regular treatment for two months, the whooping continued until the child coughed up the pebble during a violent spasm. From that moment the cough and whooping entirely ceased.

Fracture of the Larynx and Trachea.

O. Briegel ⁷⁶¹
B. 14, No. 2, '95; ⁸¹⁴
Oct. 15, '95 has collected from literature 33 cases of fracture of the trachea, with 22 deaths. In 11 of the cases there was associated fracture of the larynx or of the hyoid bone. Most of these injuries were the result of external violence, although in 2 cases coughing is set down as the cause and in 3 an excessive and sudden bending of the head backward or forward. The diagnosis could, in most cases, be established, though the fracture could rarely be felt on account of the great emphysema. Dyspnœa was a constant and very distressing symptom, with cyanosis, a small pulse, and cold skin. The respiration is described as coughing, whistling, or snoring, with tracheal râles. In some of the cases which survived cicatricial stenosis resulted, requiring dilatation. The mortality in the cases where the trachea alone is involved is not so high as in those cases complicated by fracture of the larynx or hyoid (57 per cent. and 83 per cent., respectively). The treatment varies according to circumstances. The milder cases may be treated by rest in bed, with the head fixed in a flexed position; but if severe dyspnœa occur, the trachea should be opened at once and cleared of mucus and blood and artificial respiration performed if necessary.

T. J. Harris, ⁹
Feb. 23, '95 in reporting a personal case, also tabulates thirty cases of fracture of the larynx recorded since 1881. In the author's case the fracture, which was seen some months after the

accident, occurred while playing a wind-instrument; the symptoms were sudden pain in the right side of the neck, swelling extending to the right ear, loss of voice, and dysphagia, also pliability of the bones in the neck. Subsequent double otorrhœa supervened, with persistent cough and headache, chiefly occipital, dyspnœa, and inability to swallow solids, with occasional laryngeal pain. The thyroid was excessively mobile, pomum Adami indistinct; there was pain on manipulation, and crepitus was obtained at the upper part of the right ala.

G. W. H. Kemper, of Muncie, Ind., ⁵⁶_{Nov., '94} cites a case in which throttling led to sudden death. Post-mortem examination showed increased mobility of the larynx. The thyroid gland was buried and crushed, large quantities of dark, fluid blood flowing from its torn body. Both wings of the thyroid cartilage were fractured externally, but the mucous membrane lining the larynx was not involved. There was also a dislocation of the crico-thyroid articulation on the left side and a partial rupture of the fibres of the crico-thyroid muscle on the same side.

Unshelm ⁴_{Oct. 14, '95} reported to the Berlin Laryngological Society in June a case of fracture of the larynx. In August, 1894, the patient had fallen in such a way that his neck struck a carriage-shaft. He had become unconscious and afterward expectorated blood and became completely hoarse. No treatment was instituted until shortly before the time of report, when increasing difficulty in respiration caused the man to apply for treatment. He died of laryngeal stenosis.

Joél ³⁴_{Mar. 26, '95} reports a case of fracture of the thyroid and cricoid cartilages caused by a kick from a horse, followed by œdema of the right arytenoid cartilage and aryepiglottic fold, with immobility in abduction of the right vocal cord. Tracheotomy was performed and recovery followed. Nearly two years later the right arytenoid cartilage was seen to be greatly bent forward and to be lower than the left one, from which Joél infers that dislocation of the arytenoid cartilage had occurred at the same time. George S. Middleton, of Glasgow, ²¹³_{Nov., '94} cites a case of hæmoptysis and surgical emphysema arising from fracture of a necrosed larynx. Thomas S. K. Morton, of Philadelphia, ¹¹⁹_{June 12, '95} describes a case of fracture of the thyroid and cricoid cartilages and hyoid bone. Tracheotomy was performed, but death ensued.

F. Mitry, ²⁴³_{Nov., Dec., '95} in a lengthy article on fractures of the larynx, states that Hamilton had already observed the notable difference as regards the prognosis in favor of fractures caused by firearms. Mitry himself has also observed a much smaller proportion of deaths than in the case of ordinary fractures, but 5 out of 16 cases

ending fatally. The average mortality is from 60 to 31.25 per cent. He admits that war-statistics do not furnish a good basis for such calculations; however, the rare cases occurring in civil life confirm these figures, as of three such cases recorded recovery took place in all. Mitry thinks that the cause of this relatively less serious prognosis depends upon the nature of the wound, these, as he has shown, allowing the free passage of air in many cases. Surgical treatment is also more frequent; while cleaning and dressing the wound the surgeon frequently finds that tracheotomy has already been performed, and that, like Habicot, he has only to introduce a cannula into the wound to prevent obstruction. The treatment includes no special indications except as regards the wound and the neighboring lesions. As in cases of ordinary fracture, the surgeon's first care should be to insure respiration, either by enlarging the wound so as to introduce a cannula or by performing tracheotomy. The treatment of remote consequences should then follow.

Laryngeal Neuroses.

F. Semon, of London, ²_{Jan. 3, '95} in an article on the sensory throat neuroses of the menopause, refers to the connection between the sexual apparatus and the respiratory organs, and instances conditions—such as vicarious bleeding from the upper air-passages (epistaxis, etc.)—which, although on the border-line between health and disease, yet illustrate the connection. Such conditions—not having been accorded any distinctive place in medical, gynæcological, and laryngological text-books—demand a reference. The term “throat” neuroses is used in its widest acceptation, thus including laryngeal and pharyngeal, from the fact that the power of localization of sensations felt in the throat is very defective, physiologically as well as pathologically. The author bases his results on clinical findings alone, in patients entering upon or in the midst of the climacteric period. In the majority of these there was a total absence of local or general signs known to cause or accompany sensory neuroses of the throat, and ordinary treatment applied to such neuroses otherwise caused here failed; finally, when the organism settled down to the new conditions, these neuroses disappeared spontaneously. The symptoms which set in, in patients in or about the menopause,—between 35 and 55,—vary enormously in kind and intensity, but can be summarized under two general headings,—paræsthesia and neuralgia,—the former being the more frequent. Anæsthesia and motor neuroses have not been observed. The paræsthetic sensations experienced were variously described as irritation, burning,

choking, strangulation, etc. The neuralgic sensations, less frequent, were described as fixed pains on one side of the throat. Such sensations in certain cases lead up to canerophobia. These symptoms are often the only sign of the approaching menopause or may precede it. The objective symptoms are slight; and, for the most part, appearances are normal. The prognosis is good. In attempting a diagnosis due care must be exercised to eliminate definite local lesions. The author animadvertes against trifling conditions—*e.g.*, granulations or slight varix in the pharynx—being looked upon as an explanation of the neurosis. When other causes can be eliminated and a deliberate opinion can be given that the sensations are due to the change of life, moral influence is principally to be relied upon.

A. Cartaz, ⁹⁷_{July, '95} has examined 17 cases of syringomyelia with reference only to the motor and sensory disorders of the larynx and pharynx and excluding lesions in the sphere of the trigemini and the various nerves of the face. Of the 17 cases examined, about one-half showed modifications in sensibility or motive power; in 4 cases the reflexes were abolished; in 7 cases there was paræsthesia or anæsthesia; in 5 cases paralysis of a vocal cord (of the posterior crico-arytenoid muscle in 3 cases,—once with marked atrophy of the cord and twice with paralysis of the recurrent nerve).

These findings agree with Schlesinger's observations. ⁷⁵_{'93} Sensory disturbances are more frequent than motor disturbances; indeed, they manifest themselves independently of each other, usually corresponding to the side most affected. The motor disorders of the larynx are characterized by more or less complete paralysis, but laryngeal crises and spasms are not observed as in tabes. The beginning of these symptoms is unperceived and occurs usually when the disease is already advanced; their course is progressive and fatal.

Hysterical Aphonia.

S. K. Merrick, of Baltimore, ⁶¹_{Nov. 16, '95} states that (1) paralysis of the arytenoideus muscle, due to the most usual cause,—*viz.*, acute cold,—may recover suddenly, just as hysterical cases recover, hysteria being a probable factor delaying recovery; (2) hysterical aphonia may supervene upon an old case of unilateral adductor paralysis, in which only weakness of the voice was present, leaving the voice only slightly impaired from the old lesion, the latter being still in force and unaltered, as shown by the laryngeal image.

Alessandro Trifiletti, of Naples, ¹¹⁰⁵_{July, '96} reports a case of hysterical aphonia and deafness, remarkable on account of this double mani-

festation and from the fact that return of the voice and appearance of the deafness occurred alternately. There was an hysterogenic zone in the left ovarian region—capable, on pressure, of causing a lowering of the voice—and another in the region of the bregma. Bianchi and Massei⁴⁶¹_{No. 4, '95} report a case of hysterotraumatic aphonia.

J. C. Mulhall⁸²_{Oct. 19, '96} observed a case of hysterical aphonia in a young man 37 years of age. Functional psychical hysterical aphonia in the male is very rare. Examination of the larynx revealed no adductor paralysis whatever, although there was loss of power of the internal tensors. They were perfectly loose and the tension seemed completely gone. At this time the aphonia had lasted about three months. In 1870, when the patient was about 12 years of age, he sustained a compound depressed fracture of the skull from the fall of a brick. A. J. Steele attended him in that injury and picked out the spiculæ of bone; but from that time on the patient had been an emotional subject. A considerable depression indicates the site of fracture in the occipital region over the longitudinal sinus. A diagnosis was readily made and speech was restored by some strong emotion acting on the cerebrum. This was supplied by a laryngeal electrode through which a current of considerable strength was passed. There is, probably, nothing more disagreeable to a patient than this procedure, but it acted very promptly. The second attack, relieved by the same means, had lasted two months.

[The application of electricity to the larynx may be rendered much less disagreeable by using water as an intermediate conductor between the electrode and the mucous surfaces. The patient, having taken a "mouthful" of water,—about an ounce,—is told to throw his head backward, to open his mouth, and to half-swallow the water, the latter movement causing the fluid to fill the pharyngeal cavity. The point of the electrode is simply immersed in the water, and the external electrode, thoroughly wetted in salt water, is applied over the thyroid cartilage. The current is then closed and kept so as long as the patient can hold his breath. This procedure is useful in all the neuroses of the palate, pharynx, and larynx.—C. E. S.]

According to F. J. Michelsen, of Amsterdam,³_{v. 3, p. 204, '95}⁸¹⁴_{Aug 1} the use of the voice may frequently be restored to patients suffering from hysterical aphonia by means of a mechanical procedure, which he describes as follows: After certain preparations calculated to impress the patient with the idea that something very serious is going to be done, the physician suddenly thrusts his forefinger behind the soft palate, to the farther end of the naso-pharyngeal cavity, as if it were his intention to search for adenoid vegetations.

This manœuvre usually results in a reflex cry, which is immediately taken advantage of to order the patient to count in a loud voice. As a rule, he complies and should then continue counting in going home, after leaving the consultation-room. In this manner the aphonia may be instantaneously cured. Sometimes, however, the treatment fails, particularly in the case of apathetic hysterical patients and also when the manœuvre has already been employed in the same patient.

Laryngeal Spasm.

J. Garel and J. F. Collet ³⁷_{Dec., '94} publish an excellent study of this affection, which is less uncommon than has been reported, as the authors prove by quoting 23 unpublished cases. Laryngeal spasm is a disorder of adult life (from 40 to 50 years), more common in man (21 cases) than in woman (2 cases), and occurring in arthritic individuals, through some more or less chronic irritation of the respiratory passages. In the opinion of the authors, it is in almost every case due to some peripheral excitation of the superior laryngeal nerve (enlarged uvula, pharyngitis, enlarged lingual atrophy, bronchitis, etc.). The irritation of the superior laryngeal nerve acts upon the superior centres through the intermediary of the heart, either by exciting its moderator centre or by irritation of the expiratory centre, thus provoking fits of coughing which modify both the intra-thoracic pressure and the cardiac circulation. In any event, these cases are not cases of epilepsy with a laryngeal aura, and they must also be distinguished from laryngeal crises (when they are not accompanied by loss of consciousness).

Merklen, of Paris, ¹⁴_{Dec. 22, '95} describes a case of laryngeal ictus quickly relieved by antipyrin, and adds two similar observations, —one by Lermoyez, of Paris, and another by Tuefferd, of Montbéliard. He draws the conclusion that laryngeal ictus due to various local causes depends especially on an individual neuropathic predisposition, and is thus comparable to essential asthma.

Leclerc, of Lyons, ²¹¹_{Dec. 16, '94} reported the case of a patient, 48 years old, who, for many years, had drunk to excess. At 30 years of age he contracted syphilis, which was carefully treated, was followed only by slight secondary symptoms, and had since caused no other accidents. At the age of 35 years he suffered from three attacks of laryngeal ictus within the space of one year,—1880–81. After these attacks, in 1882, he suffered from a first attack of acute gout limited to the great toe, followed by two other attacks. In 1884 a physician discovered for the first time the presence of diabetes.

The three attacks of ictus resembled each other. Tickling in the throat would cause the patient to cough, and after coughing a few times he would lose consciousness and fall to the ground. He could not say whether there were convulsive motions in the limbs, but before help could be given him he would get up, walk, and recover full possession of his faculties, resuming his occupation without the slightest consecutive discomfort. The whole attack would not last one minute. He showed no symptoms of tabes, nor the slightest stigma of epilepsy. The larynx and naso-pharynx, examined with great care by Garel, showed no lesion, the vocal cords being only slightly rose-colored,—due, without doubt, to the patient having been coughing for some days before examination. The patient asserts, besides, that he had not the slightest cold when he suffered from the attacks of laryngeal ictus. The case may, consequently, be looked upon as one of primary isolated laryngeal ictus.

P. Masucci, ⁷⁶²_{v.12, No.4} publishes an article on glottic spasm and tetany in children. From his own researches he confirms the relation admitted by Trousseau, Kassowitz, Paulsen, and others between laryngeal spasm and rachitis. In 20 cases of glottic spasm which he observed rachitis was absent in 4 cases, there were slight symptoms in 8 cases, quite pronounced symptoms in 3 cases, and severe rachitis in 5 cases. Craniotabes was absent in 4, slight in 10, and exceedingly marked in 6 cases. At times the glottic spasms were accompanied by symptoms of tetany and at times were isolated. In most cases, consequently, rachitis existed, though the author believes that spasms may occur in the absence of any such condition.

Arthur C. Brush, ¹⁵⁷_{Mar., '95} reports a case of laryngeal spasm in two adults, and concludes that the clinical picture presented is evidently but a modification of the one ordinarily found in spasmodic asthma, and due to the same pathological lesion, which is situated entirely in the lower and common centre of the pneumogastric and spinal accessory nerves. It is a condition due to the constant irritation of the sensory cells of the pneumogastric, arising from the disease of some organ to which its branches are supplied and spreading to the neighboring motor cells.

P. Raugé, of Challes, ¹³⁶_{May 15, '95} classes under the name of neuro-motor disorders only those functional disturbances which attack the larynx from remote locations through the nervous system, and without the presence of any material lesion in the organ itself. He demonstrates that this definition excludes all motor disturbances due either to a primary affection of the muscles, an articular lesion, or mechanical obstacles to the functional action of the

glottis, caused by swelling of the mucous membrane, the presence of a tumor, or thickening of a cartilage. Thus specified and circumscribed, all motor disturbances of nervous origin, of whatever nature or cause, may be included under one uniform head.

Paralysis of the Larynx.

W. Roemisch, of Freiburg-in-Bresgau, ¹¹⁵¹_{B.2, H.3, '95} discusses the condition of the epiglottis in unilateral recurrent paralysis. He has collected all the cases recorded in literature, and reports thirteen out of thirty-nine cases of recurrent paralysis observed at Killian's polyclinic, in which the epiglottis showed an abnormal action. It appears that in solitary cases the epiglottis in recurrent paralysis shows motor disturbances even during quiet breathing, narrowing, bending, or twisting over toward the paralyzed side, or even toward the healthy side; while during phonation there was a spasmodic action toward the healthy side in 27 per cent. of the cases. Roemisch describes in great detail the anatomical structure of the epiglottis, its muscles and innervation, and concludes that the superior and inferior laryngeal nerves are differently distributed to the epiglottis in different individuals, the difference in the innervation explaining the varying movements of the epiglottis in paralysis.

Treitel ⁴_{Nov.25,'95} reports a case of left recurrent paralysis, probably due to an aneurism of the aortic arch, in which the epiglottis had its posterior surface directed toward the right, being thus, as it were, turned on its axis. When the patient spoke the epiglottis would at first be drawn somewhat to the right side (the healthy one), then over to the left side, and again to the right side. The first two were active movements, the last one passive. The arytenoid cartilage of the affected side would likewise make convulsive movements in respiration and phonation, though in a physiological direction.

Similar cases have been described by Kayser, of Breslau; von Schrötter, and Moritz Schmidt.

Schadewaldt ⁴²_{May,'95} made a communication to the Laryngological Society of Berlin on a case of left recurrent paralysis previously presented. The patient had since died and the autopsy revealed, as the cause of the paralysis, a carcinoma of the mediastinum. From the fact that the paralysis first showed itself a year and a half after the appearance of the first symptoms, and four months after this had often been suspected on account of hoarseness, Schadewaldt believed that he might say with certainty that the case was one of tumor, and not of aneurism of the aorta. In these cases the paralysis of the vocal cords appears at once, before more

certain symptoms of aneurism can be demonstrated. As the latter always develops on a syphilitic basis, an early diagnosis by means of the laryngoscope enables a causal and successful treatment by innuncations to be carried out.

A. Rosenberg¹³⁶_{Sept. 15, '95} showed a patient in whom, in contradiction to Schadowaldt's affirmation, the other subjective symptoms, notably as regards the heart, had preceded for three to four years the paralysis of the left recurrent nerve due to aneurism of the heart.

F. Lüscher, of Berne,⁹⁰_{Nov., '96} presents a convincing demonstration of the recurrent laryngeal nerve and deglutition in the rabbit. After division, on stimulating its peripheral end, a movement of swallowing is performed, and, if its three branches be successively stimulated from above downward, the œsophagus contracts in three sections. Stimulation of the central end of this nerve will cause usually also a movement of deglutition.

H. Mendel²⁸⁶_{Jan., Feb., '96} presents a case proving that tabes may give rise to paralysis in the larynx of the same transitory nature as the paralysis of the muscles of the eye during the preataxic stage.

W. Lublinski, of Berlin,³⁷_{No. 4, '96} reports 5 cases of laryngeal paralysis in typhoid fever, 4 of them in males. Paralysis of the dilators occurred in 1 case, paralysis of one recurrent nerve in 3 cases, and paralysis of both recurrences in 1 case. Of the 3 cases of paralysis of the recurrent, 1 was first a paralysis of the right abductor and then of the recurrent in its totality, and 2 of them were of paralysis of the left recurrent. One of these latter was accompanied with a slight paralysis of the lower limbs and occurred during the febrile period of the disease. The other 4 occurred after defervescence.

Onodi¹³⁶_{July 16, '95} reports a case of isolated paralysis of the left lateral crico-arytenoid muscle following influenza. He states that instances of isolated paralysis of the lateral crico-arytenoid are not common. His case was especially interesting because the paralysis followed a violent attack of influenza involving only the upper part of the bronchial tubes.

Whistler¹¹_{Mar., '96} describes a case of bilateral paralysis of abduction of the vocal cords in which the later acute laryngeal symptoms were evidently due to an intercurrent inflammation. There was no syphilitic history; and the laryngeal signs, though such as might frequently be found in connection with syphilis, were not specially pathognomonic of this disease. All that could be said in support of the possible syphilitic nature of the affection was that under the administration of iodide of potassium the laryngeal inflammation very quickly passed off. The laryngoscopical image

showed no signs of inflammation at the time of report. The abductor paralysis remained as before.

Augieras¹³⁶_{July 15, '96} reported to the French Society of Otology and Laryngology a case of paralysis of the adductor muscles of the left vocal cord. A man, 49 years of age, suffering from cervical adenitis, was affected with disturbances of the voice. Laryngoscopic examination clearly showed a paralysis of the adductor muscles of the left vocal cord, including the left half of the arytenoideus muscles, and without alteration of the cricothyroid muscle, which is in contradiction to the law of Semon.

William Porter, of St. Louis, Mo.,¹_{Aug. 17, '96} speaking of compensatory arytenoid movement, reports two cases of partial one-sided ankylosis, with increased compensatory action of the opposite side. J. Morrison Ray, of Louisville, Ky.,²²⁴_{June 29, '96} reports two cases of laryngeal paralysis under his observation for a long time in which he was able to study and demonstrate the truth of the fact that by turning the head strongly to the disabled side a decided increase in the tone of the voice occurred, conversation being carried on with ease.

G. Hunter Mackenzie, of Edinburgh,¹¹_{Apr., '96} reports a case of laryngeal paralysis of the left vocal cord in the cadaveric position, in the person of a type-founder, 60 years of age, with evidences of old pleurisy at the right apex; and who had suffered from transitory melancholia five years previously. Within a short time symptoms of cerebral disease developed, from which the patient died within four months of the appearance of the laryngeal symptoms. Some fifteen or sixteen small tumors were found in the cerebrum, which, on examination, proved to be malignant papillomata; yet there was no evidence of any direct implication of pressure upon the pneumogastric or spinal accessory nerve, the nuclei of which appeared perfectly normal. There was no peripheral pressure found upon either of these nerves, at the apex of the lung, or elsewhere, and the muscles of the affected side of the larynx showed no difference from those of the other side. The cause of the paralysis was, therefore, not detected.

Butlin, of London,¹¹_{July, '96} reports a case of large mass of malignant glands in the neck, with paralysis of the corresponding sympathetic nerve and immobility of the same side of the larynx.

Tumors of the Larynx.

Cysts.—G. Hunter Mackenzie, of Edinburgh,⁶_{Dec. 7, '96} reports two cases of cystic tumor of the larynx in old persons, the one being in almost all respects a duplicate of the other. Both were successfully removed. The rarity of these cases is shown by the fact

that of one hundred cases of growth in the larynx, published by the late Sir Morell Mackenzie, only two were cystic. The important inference that one is justified in drawing from these and other similar cases is that cystic tumors of the larynx after removal show little or no tendency to recur.

Polyak¹³⁶_{Feb. 15, '96} also records a case of cyst of the left arytenoid cartilage. It was a retention-cyst, which caused no trouble and which was accidentally discovered. The location is uncommon, for cysts are generally seen upon the epiglottis or in the ventricle of Morgagni.

Adenoma.—F. Marsh²_{May 25, '95} reported a case of recurrent adenoma of the larynx and showed some large, multiple, adenomatous growths removed by thyrotomy from the larynx of a woman, aged 23, on April 20th. Twelve months before this he had removed similar growths by thyrotomy, and a microscopical examination showed them to be adenomatous. A month after the operation recurrence was noticed, and large doses of arsenic were given, which for a time seemed to have a beneficial effect. During the six months previous the growths had slowly increased in size and had lately caused much dyspnoea. Intra-laryngeal removal had not been attempted, both on account of the situation of the growths—chiefly below the true cords in the anterior commissure—and from want of self-control on the part of the patient. No complications had occurred. The tube was permanently removed on the fourth day and the patient was making a good recovery.

Corradi³⁷_{Jan., '96} reports a case of adenoma of the right vocal cord. The patient whose case is reported was operated upon some years previously for a cyst of the larynx situated on the same spot.

A case of lymphadenoma of the larynx is reported by James Donelan.¹¹_{Feb., '96}

Lymphangioma.—Koschier, of Vienna,⁶⁵⁰_{No. 7, '96} reports a case of cavernous lymphangioma of the aryepiglottic fold. A fluctuating tumor the size of a walnut and covered with normal red mucous membrane extended like a broad blister from the rear surface of the left aryepiglottic fold and the arytenoid cartilage to the middle of the cricoid cartilage, without greatly hindering the movements of the arytenoid cartilages. On removal with the galvano-caustic snare considerable milky fluid escaped with but traces of blood. Histologically the tumor proved to be a cavernous lymphangioma. There were no new growths in the formation of lymphatic vessels and the tumor was probably congenital, though it developed greatly during a period of five months following inflammation. Recovery took place without delay, but recurrence happened some months later.

Ramon de la Sota y Lastra ²³⁴_{Oct. 31, '96} also reports a case of mucous polypus of the left vocal cord considered to be an angioma.

Fibroma.—Muschold ¹³⁶_{Mar. 15, '95} showed before the Laryngological Society of Berlin a patient with a large fibrous tumor springing from the right ventricle, and dilated its entrance to such an extent that the air expired during phonation partly penetrated it; so that, at each emission of sound, the superior thyro-arytenoid fold swelled like a bulla. Even after removal of the greater part of the tumor this occurred.

In the discussion B. Fraenkel stated that he had observed the same occurrence in a patient suffering from a tumor of the vocal cord which drew the latter downward, so that the opening of the ventricle was much enlarged.

Papilloma.—Walter F. Chappell, of New York, ¹¹⁷¹_{Jan., '95} states that in papillomata in children, if the symptoms are not urgent, considerable success may be expected from endolaryngeal treatment. The chief difficulty arises from the violent struggles of the child and the quantity of mucus in the throat. He adopted a method in three children, aged, respectively, 2 years, 3 years, and 3½ years, by which he was able to remove the papillomatous masses with comparatively little trouble. The technique is as follows:—

The day before the operation belladonna is administered in small doses and increased until dilatation of the pupils and dryness of the throat are produced. An hour before the operation some preparation of opium, such as paregoric or Dover's powder, is administered until the patient is well under its influence. The resulting condition is more satisfactory for these operations than ether or chloroform anæsthesia, as complete muscular relaxation is not produced, but just sufficient resistance remains to make it an easy matter to hold the child in an upright position. This is done by one assistant, who places the child in O'Dwyer's position for intubation and holds out the tongue. A second assistant steadies the head and holds the gag. An application of 2-per-cent. solution of cocaine is then made, and the child is ready for the introduction of the laryngeal mirror and the forceps. There is very little difficulty in obtaining a good view of the larynx, as the little patient is quite passive, and, owing to the dryness produced by the belladonna, the view will not be obstructed by mucus. The papillomata may very readily be grasped and removed in the usual way.

Lipoma.—John W. Farlow, of Boston, ¹_{Nov. 16, '95} reports a case of polypoid lipoma of the larynx,—a very uncommon variety of tumor.

Tuberculous Tumors.—Jakins²²_{No. 2907, '95} reports a case of pulmonary tuberculosis, complicated by epithelioma of the larynx, in a school-teacher, 33 years old, who for four months had occasional cough and weakness of the voice. For seven years there had occurred periodically attacks of slight difficulty in swallowing, which had gradually been growing more marked. On examination of the pharynx a large cauliflower growth was detected which extended to, but not beyond, the posterior pillars of the fauces. The root of the tongue was swollen, but free from involvement. The arytenoids were œdematous, more especially the left. The left vocal band was ulcerated. On microscopical examination the growth was found to be an epithelioma. The case progressed unfavorably and terminated fatally. On post-mortem examination the right lung was found riddled with tubercles.

J. Payson Clark, of Boston,⁵_{May, '95} gives an excellent review of the previously reported cases and relates a case of his own. The patient was a woman, 31 years of age, who had suffered with hoarseness for three and a half years; examination showed a smooth, sessile, dimpled growth springing from the left ventricular band. This was removed with a snare. The patient gained twenty-five pounds in six months, and examination of the chest was negative. The growth was made up of miliary tubercles and submucous tissue. The affection is one of middle life, and affects males more frequently than females (23 to 9); only four out of forty-two cases had no pulmonary tubercle before or after. They are of slow growth and sometimes multiple, and the symptoms are hoarseness, often dyspnœa, more rarely dysphagia, and no pain, as a rule.

Baumgarten,⁴²_{July, '95} also reports a case of carcinoma of the larynx with histological demonstration of tuberculosis.

Malignant Tumors.—Bronner¹¹_{Feb., '95} describes a case of epithelioma in the epiglottis in a man of 78, suffering from a growth of three years' duration. There were unmistakable symptoms of secondary affections of the liver and lungs. The growth was partly removed by the cutting forceps, and the patient could eat and speak without any difficulty. It was very rare indeed to find secondary deposits in cases of epithelioma of the larynx.

P. Heymann¹³⁶_{July 1, '95} showed, before the Berlin Laryngological Society, a preparation of carcinoma of the larynx. On laryngoscopic examination the tumor was visible only on the left aryepiglottic fold, but the autopsy showed that it had destroyed the greater part of the left side of the pharynx.

Butlin, of London,²_{Oct. 26, '95} states that the dangers of exploratory thyrotomy and of thyrotomy with removal of intrinsic carcinoma

are very slight. An operation is advisable in cases of carcinoma of intrinsic origin if it be of limited extent, especially if the arytenoid region be not involved, and in which the lymphatic glands of the neck are not affected. Great care must be taken in the after-treatment. No dressing is inserted into the interior of the larynx. The head should be kept low and the patient on his side. On the next day water or other fluids are taken into the mouth and an attempt is made to swallow, which is generally successful.

Laryngectomy.

Felix Semon, of London, ⁶_{Dec. 22, '94} gives the results of radical operation for malignant disease of the larynx, from the experiences of private practice. Out of 12 cases in which radical operations were performed the method was as follows:—

	Cases.	Recoveries.	Deaths.
Partial extirpation of the larynx,	3	1	2
Thyrotomy with resection of portions of cartilage,	4	4	0
Thyrotomy with removal of soft parts only,	4	2	2
Subhyoid pharyngotomy with removal of soft parts only,	1	0	1
Total,	12	7	5

The author states that, if it be assumed that 2 cases in which the malignancy was doubtful were actually of a malignant nature, it will be seen that 5 patients died from the consequences of the operation and 7 recovered,—a result which, though at first sight apparently not very brilliant, must be considered eminently satisfactory, as it means the saving of fully 58.3 per cent. of the patients from an otherwise inevitable death. This is certainly a most encouraging advance in our treatment of malignant disease of the larynx and considerably surpasses the results hitherto recorded. He, therefore, thinks that, with regard to recurrence, his results are most encouraging, the more so if it be considered that most of them have been obtained by operations which, only a few years ago, were believed, by those most competent to judge, to be altogether insufficient to eradicate the disease. Equally satisfactory are the results so far as phonation is concerned.

The author describes the improved technique under which satisfactory results are to be anticipated by the method of splitting the larynx in front and then removing the soft parts, and likewise, if necessary, resecting some portions of the cartilages.

The first step is tracheotomy and the introduction of Hahn's aseptic compressed sponge-cannula into the trachea. The larynx is then exposed, but is not opened until the cannula has been in

position at least ten minutes, in order to give the sponge full time to expand and occlude the trachea hermetically. After the larynx has been divided its two halves are carefully held asunder with retractors or with two strands of strong silk passed through the anterior portions of the wings, and a comparatively large aseptic sponge secured by a long string is introduced through the larynx into the lower part of the pharynx, so as to protect the field of operation from mucus and saliva. The whole of the side of the larynx to be operated upon is then mopped twice with a 5-per-cent. solution of cocaine, to contract the capillaries on that side and restrain parenchymatous bleeding. Arrangements should have been made for thorough illumination by aid of the frontal mirror or of an electrical lamp.

The parts to be removed are then circumscribed as far as possible between two semicircular or elliptical cuts uniting in front and behind through the whole of the soft tissues and down to the perichondrium, and at a distance of from half an inch to an inch from the periphery of the growth, so as to insure section in the healthy tissues. The growth is then to be held in dressing forceps, and the whole area circumscribed is to be cut out with curved scissors, the points of which are to be firmly pressed against the inner aspect of the cartilage. The base should be firmly scraped with a sharp spoon, the bleeding being carefully stopped, even by ligating small vessels if requisite, and the whole interior of the wound be dusted with iodoform or with iodoform and boric acid mixed in equal parts, and the sponge-cannula be immediately removed. The whole of the wound is then covered with cyanide gauze.

White and Power, ⁵⁹_{Mar. 23, '95} among 309 cases collected from various sources, found that 101 died within the first eight weeks after operation from shock, hæmorrhage, pneumonia, septic infection, or exhaustion. The mortality after complete laryngectomy was 35 per cent.; after partial excision, 27 per cent. In both the complete and partial operations there are but 2 instances of relapse after a period of three years. The ultimate prognosis of operations for malignant growths of the larynx is still far from encouraging. They report 6 cases of partial and total laryngectomy (included in the above statistics) 5 of which were operated upon by Bull. Death took place from recurrences in 4 cases at periods varying from a few months to one and one-half years; while in the fifth case, one of partial laryngectomy, the patient was still well at the end of four years.

Péan, of Paris. ¹¹⁵³_{Jan. 26, '95} ¹⁵_{Mar.} reports a case of extirpation of the larynx and part of the œsophagus for a cancerous tumor, diagnosed

by laryngoscopical examination. Although apparently limited to the left side, it was found that it had extended to the other side and had also invaded the upper part of the œsophagus, while disease was found above the larynx, involving the hyoid bone and base of the tongue. The whole mass was removed, and, to compensate for such extensive loss of substance, the œsophagus was drawn up and stitched to the skin in the upper angle of the wound, the trachea, with a cannula inserted in it, being also secured by suture to the skin below. An artificial larynx was supplied, which not only enabled the patient to swallow, but also allowed of the passage of air inspired through the nose to the trachea.

The following conclusions were drawn from the case:—

1. That it is impossible, prior to operation, to be certain of the extent of the disease where no subjective symptoms are present.

2. That the surgeon must never promise beforehand to limit the operation to removal of only a part of the larynx.

3. That most extensive operations, including even the removal of the hyoid bone and base of the tongue, can be undertaken with safety and success.

4. That, after such operations, important modifications of the anatomy of these parts operated on always follow, the abnormal openings of the trachea and œsophagus being raised, and the epiglottis and root of the tongue sinking.

5. That, thanks to suitable mechanical appliances, the functions of the parts can be to a large extent restored even after most extensive operations.

Thyrotomy.

P. de Santi ⁶_{Aug. 17, '96}; ²_{Oct. 26, '96} gives the results of the operation of thyrotomy with a short account of the cases in which it has been performed at St. Bartholomew's Hospital during the last nine years. Thyrotomy was first performed at St. Bartholomew's Hospital in 1866; since then nine thyrotomies had been performed there for malignant disease and eight thyrotomies for innocent growths and other causes. Butlin's private cases were nine for malignant disease and two for innocent growths, which altogether make twenty-eight thyrotomies. De Santi preferred chloroform to ether in this operation on account of the excessive secretion of saliva. He also laid stress upon the sponge round the Hahn tube being aseptic. He advocated the use of a 5-per-cent. solution of cocaine to the larynx after division of the cartilage, to lessen the hæmorrhage and remove reflex excitability. The sponge-cannula is to be removed and the wound dusted with iodoform and

covered with gauze; the patient should be kept on his side with the head low in order to facilitate the flowing away of the discharge and lessen the risk of pneumonia. The feeding of the patient during the first two days is chiefly done by nutrient enemata; on the day following the operation the power of swallowing should be tested.

Tracheotomy.

Leonard Gamgee ³²_{Mar., '55}; ⁴⁵¹_{Aug., '55} discusses in detail 25 tracheotomies on children under 12 years of age. Of this number, 21 were operated on for membranous croup or diphtheria and 11 were cured. Of 8 patients 2 years of age or under, only 1 recovered, and this one was suffering from a scald of the larynx. Of 16 operations on children more than 2 years of age, 13 were cured.

Quoting from the statistics of Fischer, of Hanover, the writer says that from January, 1884, to September, 1893, there were admitted into the hospital at Hanover 1510 cases of diphtheria, and upon 1000 of these tracheotomy was performed.

In 1885, when there was no epidemic of diphtheria or scarlet fever, there was 48 per cent. of recoveries. In 1886 and 1887, when there was a severe epidemic of scarlet fever, the recoveries fell to 27 per cent. These figures show the dependence of the results of tracheotomy for diphtheria upon the type of the disease, proving an increased mortality when an epidemic of scarlet fever or diphtheria exists at the same time. Two other main conditions influence the result of the operation. They are the existence or not of pneumonia and the extent to which the symptoms of asphyxia have been allowed to progress.

Krasnobaïeff ⁹¹_{Oct. 10, '95} reports seven cases of suture of the tracheal wound after tracheotomy, of which three are personal. He concludes from these observations that if the glottis is free for the passage of air it is not necessary for the trachea to be hermetically sutured. It is sufficient to draw the edges of the wound together to induce union by first intention. The expired air passing through the point of least resistance,—that is, by the glottis,—subcutaneous emphysema is not to be feared.

Buchholz, of Riga, ²¹_{No. 24, '95} reports two cases of fatal bleeding following tracheotomy performed for diphtheria. The first was that of a child, 1½ years old, in which the hæmorrhage took place ten days later through the tracheal wound, and ended in death. The post-mortem examination showed a perforation of the trachea communicating with the innominate artery, which was also perforated. In the second patient, a child 1 year and 9 months old, arterial

hæmorrhage occurred three days later through the tracheal wound. Next day there was improvement. Three days later a second hæmorrhage was followed by death. The post-mortem examination also showed perforation of the trachea communicating with a cavity in the innominate artery.

Speaking of the comparative results of intubation and tracheotomy in croup at the Société de Médecine et de Chirurgie, Courtade¹⁴_{Dec 2, '94} considers that, although the success of the two operations varies greatly in different hands, intubation is always preferable to tracheotomy for children under 2 years, and nearly always for those under 7.

INFRA-GLOTTIC SPACE.

Stenosis.

Sajous, of Paris, ²²_{July 31, '98} pointed out that the infra-glottic space had not received the attention its importance as an inherent portion of the larynx warrants. As a consequence, the part it plays in connection with the diseases of that organ is still insufficiently appreciated, and the disorders to which it is itself liable have not as yet been clearly differentiated. He urged that examinations of the larynx should include the infra-glottic space. He remarked that the forms of stenosis peculiar to the lower infra-glottic region presented features of unusual danger, and symptoms likely to be ascribed to disorders in which iodide of potassium is usually administered. Seeing that iodide of potassium greatly increases the dangers of infra-glottic stenosis, it should not be administered in a case presenting dyspnoea as a symptom, unless the non-existence of stenosis be ascertained by infra-laryngoscopic examination, or the causative disease be clearly recognized as independent of the respiratory tract. He advised that preliminary tracheotomy should be performed when iodide of potassium is to be administered during the existence of advanced infra-glottic stenosis. He concluded by expressing the view that the treatment of laryngeal disorders involving the glottis is much more effective when the infra-glottic region is considered as a part of the diseased area.

Massei, of Naples, ⁶⁷³_{Sept., '96} states that a distinction must be drawn between laryngeal stenoses proper and infra-, or sub-, glottic stenoses; this is especially necessary from their similarity of symptoms. Again, clinically, severe cases require separation from the milder forms; clinically, on account of those cases of spasm superadded to disease. The infra-glottic tract is the most frequent seat of syphilis, tuberculosis, growths, rhinoscleroma, and also

foreign bodies. Slighter laryngeal stenoses are frequently curable without local treatment, as syphilitic affections; for this sublimate injections, with or without iodine, is the best treatment. In simple inflammatory or neoplastic stenoses intubation offers the best result. Too great belief is placed in general antisiphilitic treatment in severe stenoses, and this may be fatal. Syphilitic perichondritis yields only when general treatment is aided by surgery. Swelling in the cricoid region and ankylosis of the arytenoids do not usually improve much. Gummatous chondritis frequently requires surgical aid. If syphilitic stenoses are treated they generally require careful supervision. Tracheotomy is advisable in children suffering from stenoses caused by papillomata and endolaryngeal removal, and not by thyrotomy. The choice between intubation and tracheotomy is influenced by (1) the form of the stricture and (2) the cause of the stricture. In certain cases no tube can be passed through the larynx, and tracheotomy must be performed. Foreign bodies fixed in the larynx or subglottic space indicate the same treatment.

Tumors of Infra-glottic Space.

According to G. Ferreri <sup>1153
Nov. 2, '95</sup> subglottic polypi often cause greater obstruction to respiration than ordinary polypi; on the other hand, they do not cause any changes in the voice until they come in contact with the vocal cords, whereas tumors of the glottic region alter it from the first. Their development is insidious and they can only be diagnosed at an advanced period,—which explains the fact that they are usually of greater size than supra-glottic polypi. The most common form of benign subcordal tumor is the fibroma; myxoma is not quite so frequent, but it is not uncommon to find it associated with fibroma in the form of fibromyxoma. Exceptionally, cysts, chondromata, and circumscribed keratosis have been noted. Papilloma has never been found in this region. The extirpation of these tumors is rendered difficult by their position on the anterior half of the larynx. The operative prognosis of fibromata is particularly bad, owing to their hardness and the resistance they offer to instrumentation; further, as they are often sessile, patients are exposed to the risk of having portions of them remain during all their lives. As a rule, however, they may be removed by endolaryngeal methods (forceps, snare, galvano-cautery). Attacks of suffocation may render tracheotomy imperative, in which case it is sometimes advisable to remove the polypus through the cervical wound. When these different means have failed and interference is absolutely necessary, infra-thyroid laryngotomy may be performed.

ŒSOPHAGUS.

Stricture of the Œsophagus.

In a consideration of the recent methods of gastrostomy for stricture of the œsophagus, Willy Meyer, of New York, ⁵ 673 _{Oct., '94; Feb., '95} states that there are now three useful and reliable methods at the surgeon's disposal. Of these, Witzel's method prevents leakage with absolute certainty, and the other two, if properly carried out, promise the same good result. The patient need not, therefore, suffer from regurgitation of the food alongside the tube. The operation should be resorted to early in cases that will sooner or later require it. In burns of the œsophagus primary gastrostomy and dilatation of the contracting scar will most probably prevent conditions that at present generally confront the surgeon and are incurable. Witzel's method is preferable, as the oblique canal produced by it will close spontaneously when the tube is removed, and a secondary operation will be unnecessary. In cases of cancer of the œsophagus a gastric fistula should be established as soon as the scales show a steady decrease in the patient's weight. Sabanejew-Frank's method seems destined to become the standard one for malignant stricture of the œsophagus, though further experience is needed to establish its position. Von Hacker's method should be reserved for far-gone patients, and if the patient be very weak it should be done under cocaine anæsthesia, preferably in two sittings.

John A. Wyeth, of New York, ⁹⁶ _{Mar., '95} records a case seen by him four years ago. An Italian woman, four months pregnant, swallowed some acid accidentally, and had, in the course of two or three weeks, complete occlusion of the œsophagus. When she came to him she could not swallow liquids. He performed immediate gastrostomy, and fed her through the opening until her child could be born at term. He failed utterly to pass a bougie from below upward, or even to find the stomach-opening of the œsophagus, probably because it was closed by stricture. The woman disappeared from view for a year, and then she was swallowing whatever she cared to eat. There had been no treatment meanwhile. The case showed that by rest following gastrostomy, then beginning to swallow fluids and later solids, the œsophagus could be restored to function.

W. S. Watson, of Fishkill-on-Hudson, N. Y., ⁶¹ _{Dec. 7, '95} reports a case of œsophageal stricture of forty years' standing successfully treated by electrolysis. He states that it is necessary to have a good, reliable galvanic apparatus, with an evenly graduated rheostat and milliamperèmeter; six or eight olive-shaped bulbs of as

many different sizes, beginning with a three-eighths inch and increases two-eighths each treatment, made preferably of aluminium and fitted with a deep screw-thread to a copper wire that is covered with hard-rubber insulation to protect the mouth and throat; shaft about sixteen inches in length, sufficiently flexible to admit of some bending, the better to enable one to follow the curves of the throat, yet sufficiently stiff to support some pressure; the bulbs or tips need be a perfect oval or olive, from the largest diameter in both directions, otherwise they are very difficult to withdraw and occasion unnecessary pain.

He recommends to pass the bulb down to the first stricture, then to have an assistant turn on the current gradually until 6 or 8 milliampères are reached, keeping up a moderate pressure for a few minutes, perhaps three to five, when the bulb is sure to pass. A greater amount of current would probably pass the bulb through the stricture sooner, but it would be at the expense of tissue, by reason of the destructive character of a strong current when attached to the negative pole.

W. J. Mayo, of Rochester, Minn., ¹⁰⁵_{Sept. 1, '94} reports a fourth case of cicatricial stenosis of the œsophagus (the other three having been previously reported ¹⁰⁵_{Apr. 15, '94}), in which he performed gastrostomy by Witzel's method, and adds his testimony as to its value in preventing leakage.

F. W. Murray, ⁹⁶_{Dec., '94} at the New York Surgical Society, presented a case of stricture of the œsophagus successfully divided with a string (Abbe's method) after gastrostomy.

Cancer of the Œsophagus.

At a meeting of the Society for Internal Medicine Ewald ⁸_{Feb. 13, '95} reported a case of perforation of a carcinoma of the œsophagus into the aorta,—an extremely rare occurrence. In most cases carcinoma of the œsophagus perforates the lung. The anatomical specimen shown was taken from a man, 60 years of age, in whom the existence of a carcinoma of the œsophagus had been determined. After continued use of the catheter the patient was able to take food without difficulty; but one day he was attacked by abundant hæmatemesis and died suddenly. The autopsy showed that the carcinoma occupied its usual seat—that is, a point corresponding with the bifurcation of the trachea—and that it had opened on one side into the aorta and on the other into the lung. The stomach was filled with an enormous blood-clot. At the same meeting A. Fraenkel stated that Benda had some specimens of carcinoma of the trachea and œsophagus, one of which had perforated the aorta, the perforation being about the size of a pin's

head and manifesting itself by abundant hæmatemesis. Leech and Grosvenor, of Manchester, ²_{Apr. 6, '95} report a case of epithelioma of the œsophagus with perforation into the trachea.

Moravitsky ⁵⁸⁶_{p. 276, '95} reports a case of stricture of the œsophagus due to a carcinoma treated with carmine, first given in coated pills and then in solution (with caustic soda) in daily doses of 0.6 gramme (9 grains), and continued for five months. Under the influence of the carmine the stricture commenced to dilate, allowing the patient to swallow a few drops of liquid. Gradual diminution until complete disappearance of the ganglia along the internal border of the sterno-cleido-mastoid muscle; the dyspnœa and cough ceased and the patient was able to return to his usual occupation. Carmine having ceased to exert any influence on the progress of the affection, Moravitsky prescribed pyoktanin in a solution of 15 to 100, 6 teaspoonfuls a day; this caused fresh improvement. Up to the date of report (eight months after treatment) the patient was in a satisfactory condition. The carmine in a watery paste was also used to paint the ulcerations caused by the liquids eructated, cicatrization occurring in ten days and not returning.

Ramond ⁷_{p. 665, '94} reports a case of cancerous stricture of the œsophagus, which, under the use of the catheter and specific treatment, showed such improvement that a cure was thought to have been effected; but one month later the patient returned to the hospital to die, presenting all the physical and general signs of the disease. This case is probably an example of remission in the progress of epithelioma,—a remission that has been observed more than once.

Fungous Bodies in the Œsophagus.

H. M. Silver, of New York, ⁵⁹_{Oct. 26, '95} in a paper on this subject, related several cases coming under his own observation, and gave statistics of 165 cases of œsophagotomy. Of this number 127 recovered, 38 died,—a mortality of 23 per cent. The causes of death were starvation, perforation and abscess, secondary hæmorrhage, pneumonia, etc. In four cases gastrotomy was performed, with four recoveries.

The author's conclusions were:—

1. Neglected bodies should be removed at once by operation without making an attempt at extraction through the mouth or to push it down into the stomach.
2. A foreign body of moderate size should be removed by operation as soon as impaction is considered complete.
3. Where a small, sharp body has been swallowed the œsophi-

agus should at once be opened; and the same is true where difficult deglutition is present and constitutional symptoms point to septic inflammation.

4. The use of small catheter, bougie, and sponge-probang should be condemned. A metal-capped œsophageal sound, with graduated scale, is the only reliable instrument.

5. Where the foreign body is less than thirteen inches from the upper incisors it should be removed by œsophagotomy; if farther down, by gastrotomy.

6. Stitching the wound is unessential, yet, if it is healthy, sutures may be passed, but only through the muscular and subcutaneous coats. The external wound should be left open, although a few sutures may be introduced at the upper corner, leaving it open below.

7. Absolutely no food should be taken by the mouth the first twenty-four hours, thus giving the planes of the tissues opportunity to become glued together and prevent infiltration and infection of the deeper tissues.

Feeding by tube, whether through the mouth, wound, or anus, was unnecessary; although rectal injection of water might be given the first twenty-four hours if there be thirst. After the lapse of twenty-four hours liquid food could be given by the mouth. To prevent its escape through the wound he would advise resort to Bryant's plan of making firm pressure with cotton over the wound while swallowing.

The author states that surgeons have at times made the mistake of continuing rectal alimentation until the patients had been actually starved. One very serious objection to passing the tube through the wound for alimentation was the great pain. It also engendered sepsis by allowing the patient to swallow after the first twenty-four hours. The wound healed eight or nine days sooner than when other methods of feeding had been resorted to.

William J. Taylor, of Philadelphia, ⁷⁶⁰May 18, '95 reports a case of a jackstone in the œsophagus which pressed upon the trachea and produced such respiratory distress that tracheotomy was necessary.

Crofton Atkins and E. Chaffey, of Brighton, ²May 4, '95 report a case in which the swallowing of a half-penny caused no symptoms. Death took place two months afterward from opening into the innominate artery.

Van Allen, of Madura, India, ¹⁸⁶Oct. '94 recommends the following measure to remove a fish-bone: About 4 or 6 ounces (120 or 160 grammes) of milk are given to the patient to drink. In forty minutes an emetic dose of sulphate of zinc is administered. The

milk goes down in a fluid state and easily passes the obstruction ; by a short stay in the stomach it becomes coagulated into a more or less solid mass, and on coming up forces the bone before it.

DISEASES OF THE GLANDULAR SYSTEM OF THE NECK.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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Cervical Adenitis.

Pathology.—Among other authorities, Duhamel³¹_{Dec. 14, '95} is not disposed to consider that adenitis is a manifestation of an already generalized tuberculosis; in his opinion, the bacillus, which is disseminated everywhere, penetrates, by some solution of continuity of the mucous membranes or of the skin, through the lymphatics, to the ganglion, which becomes a seat of infection.

[A distinction should be made between *hereditary* (congenital) and *acquired* tuberculosis. In the latter case the author's views seem rational and correct, being comparable with and analogous to the phenomena observed in carcinoma and syphilis. When the infection is *acquired* there is at first a local seat or focus of infection where the disease-germs develop and from which, after proliferation, they spread until the disease becomes more or less generalized,—the germs being transmitted through the lymphatic system to the lungs and thence in the blood-stream to the various organs of the body; the various glands along the course or path of transmission become affected and in turn become additional possible foci of infection. On the other hand, when the trouble is *hereditary* (congenital) the glandular manifestation is an indication of an already generalized tuberculosis.—C. S. W.]

J. Solis-Cohen, of Philadelphia,⁵_{May 9, '95} in reviewing a paper on the relation of the tonsils to tubercular glands of the neck, remarks that, with the growth of our knowledge of the paths of entry of the tubercle bacilli into the body and of the manner of their dissemination in the body, there has developed the belief that tuberculosis of the lymphatic glands of the neck, so often met with in young persons as the only discoverable lesion of tuberculosis, must be attributed to entrance of the bacilli into the body through the

oral or pharyngeal mucous membranes. Proof of this has, however, been lacking, and experimental attempts to induce tuberculosis of the glands in question by introduction of tubercle bacilli into the tonsils have failed. Krückmann ²⁰_{B. 138, '94} seems to supply this proof, for, in the course of post-mortem examinations upon the bodies of twenty-five tubercular patients at the Pathological Institute in Rostock, he was able to demonstrate tuberculosis of the tonsils in twelve, in every case in which the lymph-glands of the neck were also affected. In two of the cases there seemed to be no question that the lesion in the tonsils was the primary tubercular lesion of the body. In 60 per cent. of the cases of pulmonary tuberculosis similar inflammation of the tonsils was present, in many of these cases undoubtedly depending on absorption of the infectious material from the sputum. Krückmann expresses the belief that tubercular changes in the tonsils would have been more frequently found if serial sections of the tonsils had been made in all cases. The importance of the tonsils as a point of entrance of the tubercular virus would appear to be very clearly demonstrated. This is quite reasonable, for there can be little doubt that throughout the alimentary tract it is the lymphatic structures which are first involved when the infectious material finds entrance from the alimentary canal, and, in the mouth, the tonsils are the most important of these structures.

As a practical deduction from all this, Krückmann advocates extirpation of fissured and hypertrophied tonsils, particularly in persons having any inherited predisposition to tuberculosis or whose cervical glands are enlarged, and he would have the surgeon operating for tubercular glands at the same time carefully examine the tonsils for any evidence of inflammatory change.

[To be of best value extirpation must be done before infection has extended beyond the glands involved, else the infection will proceed, nevertheless, to generalization. When done later, it may prevent that secondary infection which follows from an over-swollen or suppurating gland, and may be of cosmetic value,—that is, to prevent unsightly and extensive scars.—C. S. W.]

Dieulafoy, ¹⁵_{July, '96} as stated in the preceding section ("Diseases of the Tonsils"), advances the opinion, founded on inoculation experiments, that a considerable proportion of the cases of enlargement of the tonsils and adenoid vegetations of the pharynx, so common in children from the age of 6 months upward, are tuberculous in nature. He obtained the tonsils from sixty-one cases treated by tonsillotomy in the Paris hospitals, and inoculated guinea-pigs, with the result that in eight cases the animals became tuberculous. In the same way adenoid vegetations obtained from thirty-five

cases were inoculated into guinea-pigs, and in seven instances the animals became tuberculous. Dieulafoy distinguishes three stages: 1. Infection of the tonsils or adenoid tissue of the pharynx. 2. Glandular secondary infection, with enlargement of the cervical glands, which may go on to suppuration, especially after an attack of some acute infectious disease such as measles. 3. Pulmonary infection, which he believes is induced by the infecting microbes traveling downward along the lymphatic channels and reaching finally the thoracic duct or the right lymphatic duct, and so reaching the right side of the heart, from which they are disseminated through the lungs. Eustace Smith⁶_{May 25, '95} arrived, by an independent course of reasoning, at a conclusion very nearly that of Dieulafoy in regard to the enlargement and suppuration of the cervical glands, though he appears to assume that the infection is derived from the pharynx, as a rule, without tuberculous lesion of that part.

Rémy¹¹³⁹_{Mar. 14, '95} gives an account of a case of tuberculous inoculation in a healthy child of 3 years, upon the situation of a small wound on the chin caused by a fall. The kisses of the mother, who was tuberculous, were probably the cause of the infection: plaque of cutaneous tuberculosis, followed by tuberculous lymphangitis of the neck, with abscess.

[If the mother were tuberculous, there is a reasonable doubt that her offspring was a "healthy child," as stated above.—C. S. W.]

Treatment.—Referring to the treatment of localized tuberculosis by pure iodine, Guermontprez¹⁰⁰_{June 25, '95} states that the action of the iodine seems to localize itself in an elective manner upon the tuberculous glands. The scab formed by the metalloiodic iodine is shed spontaneously from four to eight days after its application. Eight or ten successive applications usually insure a cure, provided the cavity is filled with crystals. No manifestations of iodism occur.

Isnardi, of Turin,⁶¹_{May 11, '95} reports success from the use of oil of turpentine in surgical tuberculosis. He uses this partly as an ointment with vaselin, equal parts, in affections of the skin, partly undiluted as an injection into fistulæ or abscesses. The fistulæ are first curetted and the abscesses are aspirated. Very intense inflammation follows, with rise of temperature to 40° C. (104° F.), but with no severe general symptoms. In four to six days abscesses are to be incised and then packed with sterilized gauze containing the turpentine ointment. The results, as detailed by the writer in eighteen cases in children, were most promising.

Le Dentu, of Paris,⁹⁹⁶_{Sept. 10, '95} states that extirpation does away

with the suppuration which, through secondary infection, impairs the general condition of the patient. When, through non-interference, the glands are allowed to suppurate and open spontaneously, unsightly cicatrices result. Extirpation, furthermore, arrests the general tubercular condition and infection of the organism. Extirpation is especially indicated: when internal medication has failed; when the glands involve the face and by their great size produce severe deformity; when they are isolated and not numerous; when they have undergone fibrous degeneration; when they are not freely suppurating. It is contra-indicated when there is impaired general health and when there exist tubercular deposits in the lungs and joints; in such cases relapse is almost inevitable. When the ramifications of the glandular chain are very extensive and difficult to reach, relapse is probable.

Dollinger, of Budapest, ³³⁶_{No. 36, '94} publishes an article on the subcutaneous extirpation of tuberculous lymph-glands of the neck, nape of neck, and submaxillary region. He emphasizes the fact that for the sake of thorough disinfection the posterior part of the scalp should be shaved and the hair and remainder of the scalp carefully disinfected. The hair is then covered with a gauze bandage. The incision is made at the nape of the neck in the hairy part, and the scar is therefore covered by growing hair. The incision begins at the level of the external auditory meatus, one centimetre from the hairy border, and passes with a slight convexity downward five centimetres backward and downward toward the median line. The incision passes through the fascia. The operator then uses the finger and elevator, exceptionally the knife, underneath the skin, advancing forward and downward to the gland-cluster. The first visible gland is caught with a narrow, long forceps with two or three blades, the gland is freed, and then gradually the entire cluster is removed with the elevator, knife and scissors being rarely used. The bleeding is slight. The lower and anterior edge of the wound becomes very elastic during this manipulation in women and children, less so in men, and can be drawn down, especially if the head be turned slightly to the diseased side. As the connective tissue surrounding the glands yields considerably when the cluster is well caught, the whole gland may be drawn out from the submaxillary and supraclavicular region through the incision.

Lymphadenoma (Hodgkin's Disease).

Pathology.—Brigidi and Piccoli, ⁷⁶⁸_{B. 16, H. 3, '94} in an article on lymphadenoma and its relation to hyperplasia of the thymus, state that

they have found, in cultures from some of the lesions, a coccus closely allied to, but not identical with, *staphylococcus aureus*. The cultures injected subcutaneously in a guinea-pig caused chronic inflammatory changes in a wide area around the seat of inoculation, but nothing marked in the internal organs.

Delbet⁷³ found a bacillus in the spleen of a woman suffering from generalized lymphadenoma in its last stages. Pure cultures of this organism were prepared and injected in large and repeated doses into a dog, causing a generalized lymphadenoma in this animal. The glands contained the bacillus in a state of purity, but the organism was not found in the blood.

Diagnosis.—Stephen Mackenzie, of London,⁶ Jan. 1, '96 reports two cases of lymphadenoma presenting unusual symptoms. There are several points of interest in the second case, the patient having suffered from pain in both legs, which was thought to be sciatica. Lymphadenomatous growth was found adherent to the bodies of the vertebræ as low down as the bifurcation of the aorta. Attention was not particularly directed to this part at the necropsy, but, in the light of the other case related, the sacral nerves may have been compressed by growth which did not attract observation. The case in most respects exemplified the usual course of this disease,—viz., glandular enlargement, limited for a long time to the neck, and then, later, generalization; but the spleen was found to have lymphadenomatous growths in its interior. There was one further feature calling for remark,—the predominance of gastric disorder. In a previous case the author had drawn attention to the gastric symptoms and discussed the possibility of there being cancer of the stomach. He remarked, however, that, while the diagnosis of cancer of the stomach would explain the pain, nausea, complete anorexia, and the wasting and anæmia, it would not account for the generalized lymphatic enlargement. At the post-mortem examination the appearance of the stomach made all present suspicious that there was scirrhus of that organ, but careful examination showed that the infiltration which fixed the viscus was lymphadenomatous growth with an extreme amount of overgrowth of fibrous tissue. Interesting in this connection is the fact that both cases were treated with arsenic, but without benefit, though in a very small minority of cases the drug undoubtedly appears to exercise an almost specific influence.

An interesting case of Hodgkin's disease is related by Nam-mack, of New York,⁵⁹ Mar. 16, '95 which presented some diagnostic difficulty. Tuberculous polyadenitis was first thought of and excluded. Although a blood examination was not made, the predominance of the lymphatic element, with absence of hæmorrhages, diarrhœa,

and of enlargement of the spleen, was considered sufficient to exclude leukaemia. The generalized distribution of the enlarged glands and the absence of invasion of contiguous structures—the swellings remaining throughout indolent, isolated, and painless—served to exclude true, local, non-infective lymphosarcomata.

Treatment.—Lecq²³⁰_{July, '95} reports a case of lymphadenoma of the neck without leucocythæmia in a patient, 48 years old, in whom operative measures had given rise to deplorable results. Later, several drops of Fowler's solution were injected into the tumor and the same medicament was administered internally in progressive doses of from 20 to 25 drops. At the end of two months the tumor had almost disappeared.

J. Dreschfeld, of Manchester,⁹⁰_{Oct., '95} also reports two cases which were rapidly cured by the administration of Fowler's solution of arsenic, 5 minims (0.32 cubic centimetre) three times daily, and 10 grains (0.65 gramme) of quinine twice daily.

A. J. Banker and A. P. Roope, of Columbus, Ind.,⁸⁶_{Nov., '94} contend that in advanced cases nothing promises so much as surgical interference, and that is frequently only palliative.

Exophthalmic Goitre (Graves's Disease; Basedow's Disease).

The actual state of our knowledge as to the nature and treatment of exophthalmic goitre is reviewed by J. J. Putnam.⁹⁹_{Aug. 8, '95} ¹⁵_{Dec.} The principal theories of the disease are (1) that it is due to localized lesions of the medulla oblongata; (2) that it is of toxic origin and that the existence of the poison is in some way related to disease of the thyroid gland; (3) that it is a neurosis. That the medulla is in some way directly or indirectly involved must be admitted, since it contains the principal centres for cardiac activity and the regulation of the vasomotor centre and of the sympathetic nerves; and, further, lesions in this centre are prone to give rise to emotional manifestations. Or, again, some of the most typical symptoms of Graves's disease have been produced by means of experiments upon the medulla. These lesions, however, are by no means constantly found post-mortem in the disease, and thus are probably only secondary, and this theory has but little to support it clinically. The next theory is that a toxin is formed in other tissues, then enters the circulation, but is not neutralized by the supposed antitoxic properties of the thyroid. Lastly, some points indicate that it may be really a neurosis, especially as some defined nerve diseases—such as tabes—have been observed as intercurrent affections. In support of this is the fact that the disease often appears after an emotional out-

break, while it often occurs as a phenomenon of a paralytic or degenerative character. These may be furthered by an increased secretion or other disease of the thyroid in a person already predisposed.

The theory that the disease is of toxic origin finds considerable experimental support. Notkine⁸⁴_{No.19,20,'95} ¹³⁹_{Oct.,'95} states that total thyroidectomy causes death of the animal, whatever its habits or the nature of its food. The death of an animal after thyroidectomy is due to the accumulation of one or more poisons in the system. The true auto-intoxication is much more marked when the animal is not fed. The thyroid gland secretes a substance capable of decomposing or neutralizing toxic substances developed by tissue change in the body. The exact nature of these poisons and of the antitoxin produced by the thyroid gland has not yet been determined. Notkine has succeeded in extracting from the thyroid gland a toxin producing all the symptoms of cachexia strumipriva. This substance, when injected into the body of an animal, first appears to be stimulating, then paralyzing. Emaciation occurs if the doses be too small to be immediately fatal. Notkine suggests that the colloid substance contained in cystic poisons is not a secretion from the thyroid gland, but an accumulation of waste-material within the body. It is the duty of the thyroid gland to rid the blood of poisonous substances by storing them up in cells of the gland, where they are neutralized and rendered harmless, then eliminated.

N. de Dominicis¹¹²_{Sept.,'95} also concludes, after a series of experiments, that thyroidectomy, when total, brings on, in from two to four days, rarely later, certain dystrophic and serious nervous phenomena that almost inevitably cause the death of the animal. The morbid condition to which thyroidectomy gives rise is due to a direct auto-intoxication, which affects principally the central nervous system. The thyroid seems to have the function of neutralizing certain toxic products that are continually circulating in the blood, and which gradually accumulate in the system, producing serious and fatal effects without the intervention of the thyroid secretion. The author found that there was absolutely no connection between the functions of the thyroid and that of the spleen.

J. Rosenblatt¹¹⁰¹_{v.3,p.3} ¹²⁶_{Oct.15,'95} states that the consequences of experimental thyroidectomy in the dog are the formation in the organism of toxins which at first have no other effect upon the general condition, except that they act upon the kidneys. A colloid degeneration of the cells of the convoluted tubes follows, and the kidneys lose their power of eliminating in sufficient quantity the

toxin formed after thyroidectomy, as well as the toxic products of the vital exchange which they eliminate in the normal condition. The true cause of the death of thyroidectomized animals is therefore the retention in the organism of toxins of which the colloid degeneration of the renal cells no longer allows the elimination: the animals die of kidney disease. Consequently, death can be retarded by the use of diuretics, and by the absence of a meat diet. The author concludes that it is very possible that the success of the substitutive method (injection of thyroid extract or ingestion of thyroid body) is partially due to the diuretic properties of preparations of thyroid glands, which properties have been reported by Fenwick, and after him many others.

Brissaud, ¹⁵_{Oct., '96} in favor of the central origin, mentions some experiments conducted by Filehne and Darduff, which, if confirmed, would tend to settle the question. After division of the restiform bodies in some young rabbits they saw all the phenomena of exophthalmic goitre develop, including exophthalmos and enlargement of the thyroid body and tachycardia. As to the exact influence of the thyroid body, Brissaud considers that the substance called "thyroprotéide," and isolated by Notkine, is a toxic agent which accumulates in the blood, an excess of which gives rise to myxœdema, and which the thyroid body, by the action of a special ferment called "thyroidin," is able to transform into a useful product. In exophthalmic goitre the increased activity of the thyroid body leads to the system becoming saturated with thyroidin.

Haskovec, of Prague, ¹⁰⁰_{July 20, '96} considers that there can be no doubt as to the fact that the disease mainly occurs in nervous individuals, and especially women, while disturbing factors, such as pregnancy, the puerperium, infectious diseases and mental troubles, shock and anxiety, play a considerable part in inducing its onset.

Referring especially to the changes in the female genital organs, Theilhaber ⁵_{Oct., '96} also concludes, from personal observation in several cases, that, in certain individuals who are predisposed to exophthalmic goitre, it may result from pathological conditions of the pelvic organs, while, conversely, disturbances of these organs may be directly due to the disease itself. Pregnancy, hæmorrhages, and operations, especially castration, may be etiological factors. Atrophy of the uterus and adnexa may result, as shown by the fact that menstruation is always scanty or absent. That more cases have not been reported is doubtless due to the fact that few patients have been carefully examined with the view of determining this point. This atrophy is due to vasomotor influ-

ences, and not to anaemia, as is usually stated. In a case of the writer's, atrophy of the uterus preceded the usual signs of the disease. With improvement of the patient's condition the organ may return to its normal condition, as in cases of hyperinvolution during lactation.

As a practical deduction from the foregoing, the writer states that young women with Basedow's disease should be advised not to marry, while the married are warned that the course of the disease may be unfavorably affected by pregnancy and the puerperium, and that the children which they bear are likely to be highly neurotic. Atrophy of the genitals demands no treatment, which, in fact, is useless. The prognosis is not hopeless, since their functions may be restored with an improvement in the disease. Local treatment is only required in the rare cases in which the existing anaemia is increased by profuse uterine hæmorrhages, when curettage is indicated. Neoplasms should, of course, be dealt with according to the usual rules.

Sigüier¹⁶²_{May, '95} gives an account of a case in which exophthalmic goitre began with pregnancy and showed some slight improvement after the confinement. The author considers that in this case there was a relation of cause and effect between the pregnancy and the appearance of the goitre. It is possible that after the confinement there is a period of repose, during which the gland has a tendency to assume its normal volume without there being an actual recovery or even permanent improvement.

Kocher³_{Feb. 6, '95} expresses the opinion that the favorable action exerted by the thyroid extract upon exophthalmic goitre in no way contradicts the theory that this affection is a consequence of hypersecretion of the gland. Certain states of excitement which sometimes occur after the extirpation of the goitre might be advanced in opposition to this opinion. For instance, a young man operated upon by him presented, during several days, symptoms absolutely similar to those of exophthalmic goitre; this was after a partial extirpation. In explanation of these symptoms, the author is inclined to consider the rapid resorption of the liquid which is abundantly secreted by the remaining portion of the gland as the most important factor. In exothyropexy (Poncet) it has been observed that the thyroid gland which is left exposed in the wound gives off a profuse secretion during the first few days.

From these facts, Kocher considers that we are justified in concluding that the thyroid body has a very great secretory activity, and that the product of secretion, when excessive, exerts an action upon the nervous system which manifests itself in symptoms analogous to those of exophthalmic goitre. A diminution

or disappearance of these symptoms is also noticeable when the product of secretion is eliminated or when it is formed in a lesser quantity, after a partial extirpation of the goitre or the ligation of the thyroidal arteries. The same result may be obtained by agents affecting the nervous system, such as galvanization of the cervical sympathetic or the internal usage of phosphate of sodium, which, in doses of from 2 to 10 grammes ($\frac{1}{2}$ to $2\frac{1}{2}$ drachms) per day, is, according to Trachewsky, very efficacious in Graves's disease. Finally, the same therapeutic action may be exercised by substances capable of causing a regression of the hypertrophied gland, such as iodine and the thyroid extract. Certain conditions of acute cachexia occurring with symptoms of tetanus within the first few hours after the extirpation of the goitre or the ligation of the thyroidal arteries have suggested to the author the idea that there exists an auto-intoxication through retention of a toxic substance formed in the nervous system itself or in some other organ.

H. Christiani, of Geneva, ⁴¹⁰_{Jan. '95} ²¹³_{Mar. '95} has made a systematic study of the changes undergone by thyroid grafts, in specimens examined at varying intervals after the operation of grafting. He finds that the graft at first becomes tumefied, then returns to its embryonic condition, and finally begins to undergo regeneration. The regeneration begins at the periphery and progresses toward the centre, together with a new vascular formation. The reconstitution of the organ is somewhat rapid during the earlier days for the part in direct contact with the inflammatory tissue, which constitutes the adhesion of the graft. It is slower for the central part, but the process is complete in about three months, the time depending, however, on the size of the graft, the smallest portions regenerating most quickly. Once formed again, they may persist as long as the normal life of the animal without undergoing atrophy. They become permanent organs, having the ordinary morphological character of the thyroid body.

Schein Moritz, of Vienna, ⁸⁴_{No. 12, 13, 14, 15, '95} ¹¹_{July, '95} states that in congenital absence of the thyroid gland the consequences do not arise till the feeding is no longer exclusively milk. Sometimes tetanus arises during lactation in women. The author reports three cases from literature in which the first symptoms of myxœdema arose as the exclusive feeding with milk ceased. This fact shows that it will be useful to feed strumous, tetanic, cretinic, and myxœdematous patients with milk. The author also relates a case in which myxœdema followed lactation.

Eulenberg, of Berlin ⁶⁹_{No. 40, '94} ¹¹_{Feb., '95} concludes that: 1. Changes are produced in the chemical constitution of the blood by the secretion

of a specific watery matter by the follicles of the goitrous gland. This secretion is due not to nervous influence, but is stimulated directly by the blood. 2. In exophthalmic goitre the amount of secretion of the gland is increased and has a definite toxic effect; further, as this secretion is absorbed directly into the veins, its toxic effects are the more readily produced. 3. Qualitative and quantitative changes are due to increased arterial supply and to the altered condition of the blood. This is proved by the pathological state of the vessels and by the relation of the disease to anæmia, chlorosis, and to infectious diseases, etc.

J. K. Kimura, of Tokyo, ²⁰⁰_{Oct. 27, '94} in a post-mortem examination of a case, noted hæmorrhage in the floor of the fourth ventricle. He also examined the blood of three patients spectroscopically; it showed a venous character and resembled reduced hæmoglobin in dilute solution. The number of the red blood-corpuscles was reduced to 3,590,319. He also found it to contain unusually minute red corpuscles, and noted the fact that the blood disintegrated sooner than healthy blood.

Hektoen ⁴⁵¹_{Sept., '95} quotes the various writers who have found a persistent thymus in exophthalmic goitre. Most of them do not attempt to explain it, but Marie holds that the thymus may undergo vicarious hyperplasia in diseases of the thyroid and hypophysis. The author thinks that this persistent thymus has been noted too often in exophthalmic goitre to be merely an accidental occurrence. He also reports a case in a girl, aged 20, where death was due to uncontrollable vomiting.

Potain ⁹⁹⁶_{Oct. 10, '95} calls attention to the fact that there is a physiological act which presents the same characteristics and produces the same troubles as exophthalmic goitre,—namely, anger. An angry man is the counterpart of a patient suffering from the above disease,—immobility of the face, procidence of the eyeballs, fixed vision; trembling, particularly of the hands; the heart beats violently, and the face, and sometimes the entire body, becomes covered with a profuse perspiration. Sometimes diarrhœa is observed, and psychical disturbances sometimes amounting to complete unconsciousness. In certain cases, indeed, a violent fit of anger has formed the starting-point of exophthalmic goitre.

Lemke ⁶⁹_{Dec. 20, '94} concludes that a patient suffers from exophthalmic goitre as soon as delirium cordis and tremor are present. All other symptoms are consecutive and of secondary nature; they simply confirm the diagnosis. He attributes the disease to a faulty chemical influence exerted on the blood by the thyroid gland. The disease, therefore, is no disease of the nervous system; one requires for its diagnostication no special neurological knowledge.

He believes the diseased product of the thyroid gland to be a special muscle-poison, the delirium cordis being the result of this poison exerted on the heart-muscle and the tremor the result of the same poison on the skeletal muscles.

Lancereaux ³_{Feb. 13, '96} reports a case of exophthalmic goitre, acromegaly, and glycosuria in a woman subject to migraine and hæmorrhoids, who, at the age of 37 years, coincident with the cessation of the menses, presented symptoms of exophthalmic goitre and, at the same time, glycosuria, polyuria, and polydipsia. This complex of pathological conditions was attributed to the same general cause,—a vasotrophic neurosis, to which Lancereaux gives the name of “herpetism.” This theory is said to render evident the indication of treatment directed toward the disturbance of the nervous system, potassium bromide and hydrotherapy responding best to the indication.

Maude ²_{Sept. 23, '95} contends that in exophthalmic goitre there is a very definite form of mental change, only lacking in one of his twenty cases, characterized by extreme motor restlessness, extreme insomnia, and occasional sensorial illusions of sight and hearing; but it is doubtful whether some cases of auditory illusions are not dependent upon Eustachian-tube catarrh, found common in exophthalmic goitre.

Fridenberg, of New York, ⁵⁹_{July 13, '95} reports a case of exophthalmic goitre with monocular symptoms and unilateral thyroid hypertrophy in a woman, aged 24 years, who, after much worry and excitement from domestic causes, developed an increase of nervous excitability with the addition of palpitation, dyspnœa, and throbbing of the vessels of the neck. On examination decided exophthalmos of the left eye was noticed, together with marked Graefe symptom and increase in size of the right lobe and the isthmus of the thyroid. In addition to these symptoms the patient presented a small, fibrillary tremor in the tongue and hands, tumultuous heart's action, carotid pulsation, venous hum, radial pulse of 120 per minute, superficial respiration, flushing and hyperidrosis, and insufficiency of the recti interni muscles of the eye. In a search of the literature the author found thirteen cases presenting unilateral symptoms. The right eye was affected in all cases except three. The general improvement in the condition of the patient under consideration would indicate that the crossed condition will eventually recede with no change in the limitation of the symptoms.

McKee ¹¹⁹_{No. 4, '95} reports a case of exophthalmic goitre in a child aged 11 years. The family history was good, except for tuberculosis on the father's side. In infancy the patient was thin and

bottle-fed; suffered from marked enuresis for several years; had had pertussis, measles, and varicella in early life; and at 10 years of age had had an attack of scarlet fever. The cardiac pulsations were forcible with reduplication of the second sound. The child improved on general tonic treatment and hyosine hydrobromate $\frac{1}{200}$ grain (0.00032 gramme) four times daily. At the present time there is seen marked exophthalmos with inability to close the lids perfectly. There is pulsation of the retinal vessels, most marked upon the left side. Occasionally the child has attacks of partial blindness. The phenomenon of "hippus" is very marked.

Jeanselme⁸²⁷_{No. 36, '94} reports a case in which there was co-existence of exophthalmic goitre and scleroderma.

Scanes Spicer, of London,²_{Nov. 17, '94} refers to the case of a young woman sent to him for the removal of nasal growths in whom the thyroid gland presented the usual thrill and pulsations; there was also tachycardia and tremor of the arms. Having removed some of the polypi, the patient at once began to improve. Both conditions had begun together three years before. The author obtained cure of the exophthalmic goitre by the removal of nasal polypi in three cases.

P. S. Donellan, of Philadelphia,⁹_{Sept. 7, '95} observed a case of exophthalmic goitre in which there was no enlargement of the thyroid gland, but a visible pulsation of the carotid arteries, noticeable at a distance of six feet from the patient. These symptoms are regarded as unusual by most observers, Trousseau designating such cases as abortive forms, and important types of the disease. The author favors the view that the excited and accelerated heart-action is the first characteristic symptom of the disease; then follows symmetrical enlargement of the thyroid gland, the exophthalmos being, as a rule, of later development.

Pässler¹⁰⁰⁵_{B. 6, p. 21; Nov., '95} has analyzed the histories of 58 patients in the Jena Polyclinic who showed symptoms of exophthalmic goitre. Of these 74 per cent. were women. Of 51 cases 29 had a neuropathic family history, in most cases on the mother's side. Rheumatism and valvular disease of the heart were each noted five times. In all cases but 1 there was tachycardia; in 43 palpitation of the heart; in 7 more other symptoms of circulatory disturbance. In 10 cases there was no goitre. Exophthalmos was present in 28 cases. The cardinal symptoms of rapid pulse, palpitation, goitre, exophthalmos, and tremor occurred together in only 35 per cent. of cases, one or more being absent in all the others. There was characteristic tremor in 90 per cent. of cases. Nervous irritability was present in 38 cases; restlessness in 19. Severe head-

ache was complained of by 32 patients, dizziness by 23, insomnia by 21. Besides the 5 cases with valvular affections, 15 had dilatation of the heart; 24 patients complained of a sensation of warmth; 29 cases had increased perspiration; 5 others local hyperidrosis; a number of cases showed periods of emaciation, alternating with times in which there was rapid increase of weight; 17 cases had polydipsia; 4 of these had also polyuria. In 45 per cent. of cases there were severe attacks of diarrhœa, with or without colic. Vomiting attacks occurred in some cases. The irritable cough, first observed by Charcot, was noted in 10 cases; in nearly all cases the breathing was rapid. This the author ascribes to a mild paresis of the respiratory muscles. In four cases there were choreic motions, although "choreic tremor" was not observed; 24 cases showed weakness of the voluntary muscles; temporary loss of strength ("giving way of the legs") was observed in 10. The reflexes were usually normal; in 6 cases they were increased; decreased in only 2. There was ankle-clonus in 2 cases. In 1 case the reflexes were similar to those in spastic pseudoparalysis. Graefe's symptom was noted only nine times, and was observed by the author in 1 out of 200 healthy persons examined for the purpose. Stellwag's symptom was present sixteen times on both sides; four times on one side. Möbius's symptom, insufficiency of convergence, was noted in 9 cases; in 1 there was marked paresis of the internal recti with double vision. The pupil-reflex was usually more active than normal. The eye-grounds were normal. In 11 cases the cervical lymphatics were swollen; in 3 cases the spleen was enlarged; 34 cases were anæmic; 4 cases had albuminuria.

In a very interesting article Hugh T. Patrick, of Chicago, studies the Bryson symptom ¹_{Feb. 9, '95} in exophthalmic goitre, and concludes that, although it is present in many cases, it is in nowise pathognomonic of this affection or even an important sign; that it has no special significance in relation to the prognosis, pathology, seat of the lesion, or treatment, and should be relegated back to the comparative obscurity of an individual in a large community of manifestations which all depend alike upon the general state,—a state which makes the French designation of the disease, "exophthalmic cachexia," quite as appropriate as any other.

Oppenheimer, ⁷⁶¹_{Feb., '95} in reporting a case of myxœdema and one of exophthalmic goitre in sisters, lays stress on the striking contrast between the symptoms of the two diseases, which is well shown in the two cases whose histories are given. This is the more striking as the cases occurred in the same family, the only apparent bond being some affection of the thyroid gland.

Treatment.—In a case in which thyroidectomy for exophthalmic goitre was performed by McCosh⁵⁹_{Aug. 24, '95} the operation was exceedingly bloody, ligatures alone not being sufficient to control hæmorrhage; so that gauze pressure had to be employed. For two weeks after the operation the pulse was very rapid, a part of the time 200, but the protrusion of the eyes diminished noticeably within twelve hours. The left half of the thyroid, which was not removed, had decreased to half its former size; the pulse now averaged about 115 or less. The patient had gained much in weight and was continuing to improve. After the operation the number of red blood-corpuscles was 50 per cent. less than before, being the greatest diminution which he had ever observed after a bloody operation.

Tuffier, of Paris, ²²_{Feb. 27, '95} reports a case of thyroidectomy in a woman whom he had greatly relieved, by partial thyroidectomy, of grave symptoms of suffocation and compression arising from the tumor. The lobe of the voluminous gland was removed. All trembling has disappeared, as well as the palpitations, while the exophthalmos diminished considerably. Picqué operated on a woman for occlusion of the intestines, due to a large fibroma, and who presented at the same time signs of exophthalmic goitre. After ablation of the tumor all these signs rapidly disappeared. Bouilly observed that in two cases of abdominal surgery he had witnessed an almost complete disappearance of goitre which had produced a certain amount of compression. In both cases he had removed the appendages of the uterus.

Voisin³_{Oct. 24, '95} reports the case of a woman, aged 32 years, afflicted with exophthalmic goitre, to whom was given 6 to 8 grammes (1½ to 2 drachms) of sheep's thyroid daily before meals. Marked improvement followed the treatment. The patient continued to take small amounts of the gland daily, omitting its use, however, for ten days every three weeks. Finally all symptoms disappeared except a slight swelling of the neck and slight exophthalmos. Dreyfus-Brisac and Bécère declared that in their hands the remedy had aggravated the symptoms of the disease.

Mikulicz, of Breslau, ⁴_{Apr. 22, '95} has obtained good results from fresh thymus glands, taken from the sheep and finely minced, the patients being readily induced to swallow the raw product when spread between slices of bread and butter. As a rule, the treatment was administered three times a week in doses commencing at 10 grammes (2½ drachms) and gradually increasing to 25 grammes (6½ drachms); so that the weekly amount of thymus consumed varied between 30 and 75 grammes (1 and 2½ ounces). The most that was given in any one case was 375 grammes (12

ounces), and Mikulicz is satisfied that much larger quantities could be exhibited without any bad consequences, as he has never seen emaciation, debility, or any of the unfavorable signs so often attending on the thyroid method. As far as regards goitre, therefore, it would seem as though the thymus gland possessed the advantage over its rival of complete innocuousness.

R. H. Cunningham ⁵⁹_{June 15, '95} gives three cases of exophthalmic goitre in which a diet of thymus produced good results. Twelve to fifteen thymus-gland (5 grains—0.32 gramme) tabloids per day were given, with great improvement, especially as regards the ocular symptoms and enlarged gland.

Chibret, of Clermont, ²⁴_{Apr. 10, '95} alludes to the good results he obtained in the treatment of exophthalmic goitre by salicylate of soda. In each of four cases marked improvement took place in a few days, particularly in one case,—a man who was totally incapacitated, but who was much better in six days and able for field labor in a month. In others the symptoms returned on suspending the drug, although it seemed, in one instance, that after two years it could be much reduced without bad effect. If, however, the patient were overfatigued or chilled, the salicylate was taken in order to prevent any return of the symptoms. The writer was led to try this treatment by finding a family arthritic history. He gives 4 to 5 grammes (1 to 1 $\frac{1}{4}$ drachms) every twenty-four hours in four doses, given in $\frac{1}{2}$ litre (1 pint) of fluid to prevent intolerance.

Glax ⁸⁴_{Mar. 2, '95}; ²_{Apr. 6} mentions 5 cases of exophthalmic goitre greatly improved by the mild sea-climate of Abbazia. Four of these patients were from 25 to 35 years of age, the remaining 1 being 50. In 1 case the exophthalmos and enlarged thyroid were particularly marked, whereas in the remaining cases the cardiac symptoms of tremor were prominent. In 2 cases the heart-beat was 120 to 140 per minute and there was evidence of cardiac dilatation. The tachycardia quickly diminished and the cardiac dilatation disappeared; the general condition also improved and there was considerable increase in weight. This favorable action of sea-air has previously been noted.

L. Regnier, ⁹⁹⁶_{Aug. 25, '95}; ⁸⁰_{Dec. 16} after discussing the theories concerning the treatment of exophthalmic goitre, expressed the belief that the greater number of successes are to be attributed to the electrical treatment conjoined to the tonic treatment of the nervous system. Galvanic electricity is applied to the pneumogastrics and cardiac sympathetics by placing the positive electrode on the nape of the neck and the negative pole on the præcordial region; the intensity of the current should be as great as the patient is capable of sup-

porting. The author found that 10 milliampères can be supported usually in *séances* of five minutes' duration. The lessened frequency of the heart-beats is very marked after this procedure. In persons who are hyperexcitable the *séance* should be conducted with gentleness and prudence.

Goitre.

Etiology.—Louis E. Stevenson, of Penrith, ⁶_{Dec.14,'96} refers to a work published in 1867 by J. Saint-Leger on the cause of goitre. In his book, "*Études sur les Causes de Crétinisme et du Goître Endémique*," in which it is maintained, after an exhaustive research into the geological formation of goitrous districts, that endemic goitre coincides with metalliferous soils, and that the chief goitre-forming element is sulphide of iron, or iron pyrites. Indeed, the author considers the latter as the most abundant and most frequent element and the only one which is never absent. Next in order of frequency comes copper pyrites (the double sulphide of copper and iron), and then, but less frequently, the sulphides of lead, arsenic, and antimony. Drinking-water was considered as the mode of transmission. Stevenson remarks that in the hills of Cumberland and Westmorland, where goitre is endemic, it is well known that iron, copper, and lead are found in large quantities. He mentions, in conclusion, that Paracelsus and other physicians of the sixteenth and seventeenth centuries accused metallic waters of causing the neck to swell and even mention iron pyrites as a cause of goitre.

In this connection, Albert S. Ashmead ¹_{Aug.24,'96} states that, in certain provinces of Bolivia, the Indians suffer much from goitre, which, in the Aymara tongue, is called "*ccotosis*." These same Indians are clay-eaters; the clay, which they call "*ppassa*," is composed of silica, alumina, lime, magnesia, protoxides of iron and manganese, potash, water, and organic matter. It is supposed to dilate the stomach and thus keep the food longer under the action of the gastric juice.

Edward L. Munson, of Fort Assinniboine, Montana, ¹_{Oct.26,'96} states that there is a strong racial predisposition to goitre among Indians of the United States, and that the tumor is, as a rule, smaller than among the whites. Localities apparently affect the growth of the tumor as well as its frequency.

George Dock, of Ann Arbor, Mich., ⁹⁹_{July 4,'96} states that goitre occurs in all parts of Michigan. It is most prevalent in the northern part, but the southern part of the lower peninsula shows a large proportion. Fifty-two reporters give a total of four hundred and seventy-seven cases. Lower animals almost always have

goitre where it is common to man. The relations of goitre in Michigan are such as to make all other causes than the character of the drinking-water doubtful.

H. C. L. Morris²_{July 6, '95}⁴⁵¹_{Sept.} practices in a district having a population of about two thousand, and he has had fifty-five cases of goitre under his care in the past two and one-half years. The soil of the district is excessively chalky, and, with few exceptions, the water-supply is obtained from deep wells sunk into the chalk. When the springs are low the water is drawn up and even consumed while still milky in color. The author attributes the cause of the goitre to the presence of calcium and magnesium carbonate in the water. Heredity, intermarriage, and the presence of iron in the water can be excluded as causative factors. The people who live on the tops of the hills and who drink stored rain-water are not affected with the disease.

Pathology.—The most frequent fact observed in ten cases examined by Reinbach⁷⁶⁸_{B.16,p.506}¹²⁶_{July 15, '95} was the presence of fine granular matter in the follicles, and in such quantity that in some cases it surpassed that of the homogeneous colloid masses. These granulations are of the greatest importance in explaining the formation of colloid matter, for they form one of the preliminary stages, and the progressive transformation from one to the other may often be seen in the same follicle. In this transformation there is not only a modification of density, but a change of color also. As to the origin of the granular matter, Reinbach locates it in certain large round or oval elements, larger than the epithelial cells, with pale protoplasm, but formed by the same fine granular masses as the rest of the follicular contents which surround it. These he considers to be only modifications of epithelial cells. The special point of interest in this process is the complete absence of homogeneous drops, of irregular balls or masses, giving birth to colloid matter by their confluence. The formation of colloid substance in goitre should, therefore, be considered as a purely degenerative process.

Experimental Goitre.—Ballet⁵⁵_{Nov. 24, Dec. 22, '94} has produced in a dog, by the use of subcutaneous injections of thyroid extract, the appearance of a tumor at the level of the thyroid gland which disappeared when the injections were discontinued. In a second dog he obtained by the same means a small, but appreciable, swelling on the right side of the neck. In a third dog the tumor again developed at the same place, and under the influence of injections of large quantities of thyroid extract the animal showed diarrhœa, melœnæ, and wasting, and finally died. At the autopsy the right lobe of the thyroid body was found to correspond to the

swelling and that it was much larger than the left lobe. Its surface was covered with ecchymotic marks. The thyroid body weighed 3.75 grammes (57 grains) instead of 2.75 grammes (42 grains), which is the weight of the thyroid body of a normal dog, which in this case weighed 15 kilos (33 pounds), whereas the one on which the experiment was made only weighed 6 kilos (13 pounds). In this case, therefore, the tumefaction was really pathological. The author concludes, therefore, that a tumefaction of the thyroid body may be provoked by injections of thyroid extract.

Alluding to the treatment of parenchymatous goitre by injections of the tincture of iodine, Brunet ²⁵_{Feb., '95} expresses the opinion that they are unjustly neglected, and refers to 88 cases, 59 of which were cured by this method. Old and fibroid goitres are not benefited, while cystic goitres are unfavorably affected. Injections of iodine are therefore only efficacious in recent parenchymatous goitres, but in these they are of great value.

Gordon Holmes ⁶_{Nov. 9, '95} also extols iodine injections and demonstrates their value by the following comparative table relating to 287 instances of all forms of goitre which have passed through his own hands:—

	Fibrous.	Cystic.	Mixed.	Exophthalmic.	Totals.	Results.		
						Cured.	Relieved.	Negative.
Males :—								
15-25	1			2	3			
25-50	7	1	3		11			
Females :—								
15-25	57		7	51	115			
25-50	82	18	23	35	158			
Totals	147	19	33	88	287			
Treatment :—								
Injection of iodine	135	1	30	17	183	111	39	33
Tapping		15			15	9	2	4
Drugs and external applica- tion	12	3	3	71	89	11	40	38
Totals	147	19	33	88	287	131	81	75

Roux, of Lausanne, ³⁷_{Sept., '95} condemns interstitial injections, and only advocates surgical intervention. In 292 cases operated upon he had a mortality of 1.36 per cent. He considers respiratory difficulties, impeded deglutition, and cardiac troubles as indi-

cations for intervention. In 104 cases he practiced ablation by Kocher's method, and in 73 enucleation by Socin's procedure; in the greater majority of cases local anæsthesia proved sufficient. He never observed operative myxœdema.

M. Ferrand⁷³_{Nov. 23, '95} refers to the dangers of potassium iodide in the treatment of goitre and relates the following case: A man, 35 years old, suffering with an enormous goitre, had been taken with congestive symptoms. A physician had prescribed an iodized ointment and 60 grains of potassium iodide a day. The patient continued the treatment for three weeks, at the end of which time the goitre had diminished in size, but coryza, dyspnœa, diarrhœa, trembling, and cachexia had supervened, and the patient had died at the end of a month with symptoms of cardio-pulmonary paralysis. The author calls attention to the opinion of Lebert, that goitrous individuals were particularly susceptible to iodism.

[I have observed the untoward action of potassium iodide administered internally in goitrous subjects.—C. S. W.]

At the Berlin Surgical Congress, Kocher, of Berne,³_{Apr. 24, '95} reported the results obtained in one thousand cases of goitre. Excluding the operations undertaken for malignant tumors and exophthalmic goitre only 3 patients had been lost out of 900 cases operated on during the last twelve years. One case of surgical myxœdema had resulted, and that was due to the fact that the half-gland that was left behind had become atrophic,—a point not noted until the removal was accomplished; the symptoms, however, soon disappeared with the use of a sheep's thyroid. Such a report is eminently satisfactory, and proves that the danger associated with this proceeding is very slight, except when the case has been neglected or the tumor is very large. Krönlein also stated that in his last 200 cases not a single patient had been lost.

Jaboulay, of Lyons,¹⁴_{May 1, '95} ⁶⁷³_{Sept., '95} has tried the treatment of goitre by simply making an incision in the capsule and exposing the parts to the air. The goitre rapidly diminished in size and the dyspnœa and dysphonia disappeared. He considers the operation only suitable for cases in which the growth is surrounded by a venous net-work of considerable size or is in dangerous relations with the trachea or mediastinum. As to the mode of action, the author believes that it may be attributed partly to blood and lymph changes and partly to purely trophic influences.

A case of regression of goitre after exposure of the hypertrophied thyroid body to the air is reported by Bérard,³⁰⁴_{Jan. 26, '95} which shows very plainly the favorable results that may be obtained from this treatment. It is easily performed and is painless.

Bruns,⁵_{May, '95} reports the results of the treatment of sixty cases of goitre with thyroid. Cases of benign parenchymatous goitre were put under treatment without selection. Cystic cases and those of malignant disease were excluded, as were also cases of exophthalmic goitre, in which, as has been shown, thyroid feeding makes the symptoms worse. Instead of raw thyroid, tabloids were used in the dose of 2 daily to adults, 1 to children. By this method of administration intoxication is least likely to occur. Unpleasant symptoms, such as palpitation of the heart, nausea, diarrhœa, tremor, headache, etc., were treated by temporary withdrawal of the remedy. The duration of treatment was from three to four weeks on the average. In young children complete recovery was the rule. In older children marked diminution in the size of the goitre was observed, with cessation of symptoms. In adults recovery was rare and less common in proportion to age. Complete return of the thyroid to its normal size is not to be expected later than the twentieth year. In some cases in which tracheotomy seemed necessary thyroid feeding removed the pressing symptoms, and in cases of partial resection of the gland with hypertrophy of the remaining part the enlargement was reduced by treatment. Mild relapses were seen only three times, and in each case rapidly relieved by renewal of treatment.

E. Fletcher Ingals, of Chicago,¹¹⁷⁰_{Aug., '95} reports several cases of his own treated by desiccated thyroids, and in addition collates others treated in Chicago by other physicians with the same preparation. In his own cases the size of the thyroid gland was rapidly reduced, though the treatment has not been maintained for a sufficient time to establish final recovery. He also calls attention to the fact that the remedy is not free from danger if given in unlimited quantities and over too great a length of time. In one of his cases, that of a student of medicine, who had a great enlargement of the thyroid gland, very rapid reduction in the size of the gland ensued, but the patient became quite ill, with a tendency to syncope, and the remedy had for the time to be suspended.

[In a case of goitre under my care, in which thyroid tablets were given, the latter had to be discontinued on account of untoward symptoms: accelerated and weak pulse with tendency to syncope, accelerated respiration with dyspnœa, increased diuresis, and progressive emaciation. There was also pronounced anorexia, which disappeared upon the withdrawal of the thyroid extract.—C. S. W.]

Kocher, of Berne,⁶_{July 20, '95} utters a warning against too sanguine views as to the success of thyroid treatment of goitre, and expresses

the opinion that this mode of treatment is not more efficacious than that by iodine. Success is only to be expected if the treatment is undertaken at the right time and is carried out with energy and patience.

John B. Roberts, of Philadelphia, ²³⁴_{Feb., '95} considers three months as ample time for the exhibition of drugs, when, failing improvement, operation becomes advisable. Pressure on the trachea causing dyspnoea and on the recurrent causing hoarseness are suggested by the author as indicating early operation. Operation in exophthalmic goitre is not approved of.

Thomas ¹⁰⁶¹_{Oct., '94} considers electrolysis, according to the method employed by Bergonié, seems simple and without danger, but the process is tedious and painful. A case is quoted where the patient, aged 34, gave up the treatment, because of the pain, after the sixteenth sitting, in spite of improvement already obtained.

Dickson, of Toronto, ¹³⁰_{May, '95} in a review of the various means of employing electricity in the treatment of goitre, states that, in the early states of simple hypertrophy, a current of 100 to 150 milliampères should be given for ten minutes at a time, a clay electrode being applied over the goitre and a large wire-gauze electrode between the shoulders. When puncture is resorted to, one should not be content with a current of less than 50 milliampères applied for eight or ten minutes, and care should be taken to observe antiseptic precautions and to see that the portion of the needle outside of the capsule is thoroughly insulated. In his experience, pure cystic goitres had proved to be the most amenable to treatment. His method was to aspirate the contents of the cyst, inject a hot solution of chloride of sodium (1 drachm to the ounce—4 to 31 cubic centimetres), apply through a trocar a current of from 50 to 100 milliampères for ten minutes, and then withdraw the salt solution. It should be remembered that puncture alone involves some risk, and that change of residence and attention to hygiene are important adjuncts to all forms of treatment.

In the discussion Rockwell objected to the strong currents advised by Dickson.

Laborde ¹⁴_{No. 27, '95} reports a case in which suffocation due to a goitre was treated by tractions of the tongue. The patient was a soldier who had a goitre of the size of an apple and who suffered from an attack of suffocation followed by syncope. Artificial respiration and flagellations were of no avail; rhythmic traction of the tongue was then resorted to, and the patient recovered consciousness after the fifth traction.

Joseph Ransohoff, of Cincinnati, ⁹⁶_{Oct., '95} reports the case of a girl of 20 years who developed a parenchymatous goitre in the left

lobe of the thyroid gland. Finding no relief from internal or external treatment, injections of ergotine were employed. In making one of the latter, the hypodermatic needle broke off and remained imbedded in the cavity. There were no immediate unpleasant results, but a year and a half later the thyroid gland was acutely inflamed, and the abscess-cavity was opened, the capsule split with the thermo-cautery, and two ounces of creamy pus, with considerable blood, evacuated. A second abscess was opened by lacerating the gland-tissue with the finger. No trace of the needle could be found. A year after the operation for abscess thyroidectomy was performed, the symptoms having become severe, and there being danger of subacute sepsis. The wound healed permanently two months after operation. An examination of the specimen showed the presence of an hour-glass-shaped cavity lined with very vascular and exuberant granulations. As substratum to these was a dense layer of fibrous tissue, within which was imbedded the hypodermatic needle. It was found in the abscess-wall, well removed from the cavity. Eighteen months after the operation the condition of the patient was as follows: Firm linear scar at site of operation. Remaining portion of thyroid gland normal. General condition very much improved. A gain of fifteen pounds in weight. The symptoms of Graves's disease present before the operation still recognizable, but very much less pronounced. Under the thyroid extract they can be brought into almost complete abeyance.

Myxœdema.

Pathology. — Referring to the relation of myxœdema to Graves's disease, P. Campbell Gowan, of Great Stanmore, Middlesex, ⁶Feb. 23, '95 concludes, after a study of the pathology and histology of both diseases, that myxœdema is certainly a possible and even a probable result of exophthalmic goitre.

Codd ²May 4, '95 reported at the Birmingham and Midland Counties branch of British Medical Association a case in which there were found post-mortem hæmorrhage into the centrum ovale and aneurism of the internal carotid close to the bifurcation into anterior and middle cerebral. The symptoms (failing memory, difficulty in performing simple actions and in speech, sensation of cold in the extremities, and swelling of the face) were of six months' duration. The face was of myxœdema type, with thick, swollen eyelids and lips; the hands were not affected, and no cerebral signs noted. On the fifth day after admission the patient had twitchings in left arm and face, became unconscious, and soon died. It was suggested that this aneurism, pressing upon the

pituitary body, interfered with its function, and so produced the symptoms referred to.

Köhler ⁴_{Oct. 8, '94} ²_{Nov. 24} relates the following exceptional case of myxœdema in a woman aged 48. In addition to the characteristic symptoms of the disease the whole of the front of the neck was occupied by a dense thickening of the skin, so that no thyroid gland could be felt. A large, breaking-down gumma was present in the sterno-mastoid muscle. Antisyphilitic treatment had not only a remarkable effect on the indurated skin, but the symptoms of myxœdema also improved considerably. The patient died later of cerebral syphilis. The author records another case in a woman, aged 25, also with symptoms of myxœdema. On the side of the neck there was a swelling extending from the cricoid cartilage upward. In places it presented a bluish-red, livid appearance, looking like scrofuloderma. It had been treated elsewhere on several occasions, but unsuccessfully. Characteristic granules of the actinomyces were found in the pus. The affected skin was removed, and the thyroid was seen to have been partly destroyed, only one-half of the gland remaining. The diseased tissues were scraped away. Not only was the local lesion thus cured, but the symptoms of myxœdema were greatly improved. The author thinks that the actinomyces, in destroying the gland, had also caused the myxœdema. By the operation the fungus was removed. The gland, only partially disabled, recovered its function. The specific thyroid treatment was unnecessary. The disease was apparently a primary cutaneous actinomycosis, and was easily traceable to the patient's occupation.

Masoin ¹⁴_{Feb. 6, '95} reports several cases of myxœdema studied by the hæmatospectroscopical method of Hénocque. In two cases of congenital myxœdema the figures, as regards oxyhæmoglobin, were 6 per cent. and 7 per cent. In a case of acquired myxœdema he found 6.5 per cent. This marked diminution of the hæmoglobin in the blood of myxœdematous subjects had already been cited by the author in experimental myxœdema produced by ablation of the thyroid gland.

Chataloff ³¹_{Feb. 27, '95} presented at the Society of Neurology and Psychiatry of Moscow a case of myxœdema which had had a peculiar evolution. The patient was a midwife, 44 years of age, who had been well until fifteen years ago, when she first experienced pain and tumefaction of the finger and of the dorsal portion of the wrists following disinfection of the hands by a solution of corrosive sublimate. Five years before the report the like symptoms were provoked by a similar cause, but this time they persisted. Six months later pain and swelling of the toes, feet, and legs occurred,

and very soon there was paralysis of the left arm and weakness of the lower extremities. The author emphasizes the fact of the rarity of paralysis in myxœdema. The statistics of the Clinical Society of London show that in 109 cases of myxœdema there were only 14 cases of paralysis.

Alluding to myxœdema and its differential diagnosis from chronic nephritis, M. A. Starr⁹_{Dec. 15, 22, '94} draws attention to the similarity of many of the symptoms of these two conditions. Œdema occurs in acute nephritis, and is most prominent in the face and dependent parts. In myxœdema the swelling affects the forehead, the upper as well as the lower eyelid, the bridge of the nose, the lips and tongue, differing from acute nephritis; it is more intense over the masseters and in the supraclavicular spaces, which are rarely affected in nephritis. The abdomen is more affected than the back; the limbs are uniformly swollen; the genitals are not markedly swollen. There is no pitting on pressure in myxœdema; the onset is gradual and slow, not acute, as in nephritis. In both granular kidney and myxœdema there are traces of albumin and hyaline casts; both are slow in onset and present the same gastric and cerebral symptoms and the pale-yellow color of skin. In granular kidney the œdema only affects the ankles and legs after standing and is not very well marked. The skin in myxœdema is dry and scaly,—a condition rarely, if ever, met with in chronic nephritis; the skin again is never stretched thin, smooth, and glossy, as in ordinary œdema, and there is also the high, rouge-like color over the cheek-bones not seen in nephritis; another symptom is the inability to perspire. In myxœdema the nutrition of the hair generally is affected, never in nephritis. In myxœdema there is usually depression of temperature, which is rare in nephritis and other diseases; this is also accompanied by a subjective feeling of cold. The mental changes in myxœdema are mental depression, defects of memory from inability to use the mind; and the hallucinations, which frequently occur at night, are recognized as products of the mind, but are not firmly believed in, and do not become the cause of excitement; there are not the marked depressions, especially on awakening, nor the facial expression, nor the self-accusations of melancholia. The tendency of the patient generally is to dementia, from which state he can be roused to thought and show few defects of mental action and incoherence of speech.

Godard-Danhieux⁸⁶⁸_{Oct. 12, '95} saw a case presenting the essential symptoms of myxœdema, with the peculiarity that the abdomen was the seat of considerable ascites. The treatment by thyroid extract caused the disappearance of all the symptoms, and the

patient is now in perfect health. Embley²⁸⁵ June 20, '95 reports a case of myxœdema with symptoms simulating ovarian tumor. A fatal case of myxœdema is reported by F. Tresilian.²² Mar. 13, '95

Treatment.—Vermehren⁶⁷³ Nov., '95 relates sixteen cases of myxœdema treated with preparations of thyroid gland. In two of them in which exact estimates of the metabolic processes were made, the metabolism of proteids was found to be excessively small, not larger than in healthy persons in complete inanition, and the proteids of the food were digested in a defective manner; when thyroid preparations were ingested, more nitrogen was excreted and the whole metabolism was improved. When young and healthy persons took thyroid tablets, no important effect was observed, but in elderly and somewhat senile persons the excretion of nitrogen increased, although neither the ingestion of proteids nor their digestion in the intestine was influenced by the use of thyroid extract; at the same time the weight of the body diminished and the pulse became more frequent. Acceleration of the respiration, rise of temperature, and increased diuresis were also observed. (Report of Corresponding Editor Levison, of Copenhagen.)

Dennig,³⁴ No. 17, '95 in a series of experiments upon three patients, observed decreased assimilation of the nitrogenous principles, and in one this decrease assumed alarming proportions.

The influence of thyroid extract upon nutrition has been studied by Charrin.⁹²⁷ p. 853, '94 He found a decided emaciation in animals to which he had administered this extract. In some of the patients in his service, very obese and rather myxœdematous, he obtained the same result; after ten months' treatment the weight of one patient was reduced from 131 kilos to 112. When the treatment was suspended, the obesity re-asserted itself. There was very little modification of the urine,—a slight degree of polyuria and cystinuria.

Révilliod¹⁹⁷ Aug. 20, '95; ² Nov. 2 describes the effects of thyroproteid and thyroidin discovered by Notkine. The function of thyroidin is to neutralize and eliminate the thyroproteid. The author concludes that myxœdema may result from (1) excess of thyroproteid or (2) deficiency of thyroidin; while thyroidism (exophthalmic goitre) may result from (1) deficiency of thyroproteid or (2) excess of internal secretion of thyroidin. This explains why an enormous goitre may be compatible with health if the two substances are in proportion to maintain physiological equilibrium. The conception, however, of the influence such a gland as the thyroid exerts on metabolism must be enlarged when we consider that other hæmopoietic glands act together with it, and possibly,

to some extent, vicariously. In fact, for nutrition to be in equilibrium it is necessary for a certain combination of humors to circulate in the system.

Otto Lanz⁹⁹_{Oct. 17, '96} gives some interesting experimental studies which he has carried out with regard to thyroidism, from which he concludes: 1. Thyroidism is due to two component causes,—(a) a poisoning from the absorption of putrid material, and (b) a specific effect of the thyroid gland *per se*. 2. The latter effect, the true thyroidism,—or, as it is better named, “hyperthyrosis,”—varies in intensity according to the dose and method of preparation of the thyroid material and according to the species and resisting-power of the animal experimented upon. 3. The toxic principle which produces thyroidismus is capable of communication either by the placental circulation or the milk from a mother to her young.

Becker⁶⁹_{No. 37, '96} combats Lanz's views by recalling the observations of Leichtenstern, who, by the careful administration of this agent in one hundred and sixty-two cases, saw no permanent ill effects, and those which did occur were transitory and were relieved when the drug was stopped. Leichtenstern further claimed that the cause of these symptoms, termed “thyroidism,” does not lie in the agent itself, but that by means of its influence on metabolism products are formed inducing the condition. This view seems favored by reason of the frequency of this thyroidism in proportion to the activity of thyroid extract on the system.

H. C. L. Morris, of Bognor,⁶_{Sept. 28, '96} studied the effect of thyroid extract in myxœdema complicated by angina pectoris, watching carefully the effect upon the heart, beginning with half a tabloid (5 grains—0.32 gramme) twice a day. The patient experienced no discomfort until the twelfth day, when he again had a severe attack of angina pectoris and the author had to discontinue the extract. Neither before nor since have his attacks been anything like so serious.

J. J. Schmidt⁶⁹_{No. 42, '94} has obtained good results with thyroid feeding in a desperate case of myxœdema. He advises beginning with small doses—smaller than those usually given—until the cutaneous swelling begins to disappear. About 1 gramme (15 grains) a day will suffice and not expose the patient to danger. With appearance of alarming symptoms—headache, vomiting, pain in the kidneys, and increasing pulse-rate—all forms of the extract should be discontinued at once. He regards a long-lasting treatment, with careful watching of the patient, as requisite for a definite cure.

S. J. Meltzer⁸¹⁴_{July 1, '96} states that the treatment of acquired myxœdema in the adult is almost universally successful. Where failure

occurs, it is generally in inexperienced hands or the thyroid itself is not good. For a continuous good result, the treatment must be maintained; but, as the action of the thyroid is cumulative, intervals of cessation from treatment, varying in the different cases, are necessary. In winter larger doses and shorter intervals are necessary than in summer. A feeling of cold is an indication to renew treatment. Increase in weight, while it may be an indication to resume treatment, may also be simply an evidence of good health. The author prefers thyroid in the form of powder to the tablets. He gives, at the beginning of treatment, 1 grain (0.06 gramme) of the powder. No severe toxic symptoms can follow this initial dose, which is to be cautiously increased.

Referring to thyroid feeding, Eulenberg ⁶⁹ Aug. 15, '95 draws attention to the abuse of this treatment owing to the unrestricted sale of thyroid preparations, and especially tablets. Since the investigations into the use of this agent in the reduction of obesity it has been adopted by many of the public, and especially women, without medical supervision. The author relates such a case, in which a well-known artist had taken as many as six tablets in the day, whereas two tablets only should be administered, unless in exceptional cases, when the results should be carefully watched. Very severe nervous and cardiac symptoms ensued, and a loss of nineteen pounds in weight within two months. These symptoms were apparently due to an hydræmic condition of the blood without visceral lesions. Restrictions should be placed upon the sale of these thyroid preparations.

[This is a well-timed warning, as thyroid tablets and extract have in them the elements of danger, the early signs of which are not likely to be appreciated by the laity. The dose (1 to 2 tablets three times daily) given on the labels of the original bottles in which the remedy is sold is, in most cases, too large.—C. S. W.]

Béclère, ¹⁵² Jan. 25, '96 in referring to the dangers of thyroid feeding, remarks that the benefits to be derived from thyroid feeding in myxœdema must not make us forget its dangers; for thyroid juice poisons the heart and may cause death by syncope.

Taty and Guérin, of Lyons, ¹⁰⁸ Nov. 1, '96 reported a case of myxœdema treated by the ingestion of thyroid, and another, that of an imbecile having a goitre, which they treated with thyroidin. Both cases were successful. In their opinion the toleration of thyroid medication does not depend upon the volume of the thyroid body, but upon its functional activity. This fact explains the very variable effects observed in the individuals thus treated, whether suffering from myxœdema or exophthalmic goitre.

Congenital Myxœdema; Cretinism.

A case of congenital myxœdema is studied in detail by Bourneville, ⁷³ July 20, '95 in which the parental etiological factors are well shown. The father was a large and strong man who, after a terrible emotion, became bald in one night; he was excitable and probably died from cancer of the intestines. The paternal grandfather suffered from paralysis, while the paternal uncle had died during an apoplectic attack after prolonged hemiplegia. A paternal cousin had died of epilepsy. The mother was a large woman who had had slight convulsions during infancy, migraines at the age of 16 to 23, which disappeared after marriage. The maternal grandmother was a paralytic. One maternal granduncle and three cousins had died from tuberculosis; a second cousin also. A maternal aunt was hysterical. There was no consanguinity between the patient's parents, the difference between their ages being seven years. Conception having taken place at the beginning of October, 1870, the mother experienced two violent emotions, at the end of December, with prolonged loss of consciousness, followed by violent trembling. Cessation of movements of the child and a considerable development of the abdomen followed, the labor taking place at seven months. At birth the child showed asphyxia, which persisted for three days. The development was that of a cretin, death occurring in 1893. The autopsy showed: thin cranial bones; persistence of anterior fontanelle; absence of synostosis; slight hypertrophy of the pituitary body; complete absence of thyroid body; no traces of thymus; supra- and infra- clavicular cervical pseudolipomas in the posterior mediastinum, etc.; absence of mammary glands; congestion of both lungs,—cretaceous tubercles; small renal calculi; interstitial nephritis; partial cirrhosis of the liver; atrophy of the uterus.

Lebreton and Vaquez, ¹⁵² Jan. 18, '95 studied the blood in a case of congenital myxœdema treated with thyroid. The diameter of the red corpuscles before the treatment began was 3.13μ ; afterward it was 7.5μ . At the same time the appearance of nucleated red corpuscles was observed, which disappeared under treatment. It would appear as though the persistence of the foetal state of the blood coincided with the tardy development of the body. Kraepelin observed the same modification of the blood two years ago.

Alluding to the effects of thyroid administration, G. W. Crary ¹⁰⁹ July, '95 expresses the belief that many so-called idiots, imbeciles, cases of arrested development, etc., among children, are, in fact, cases of functional inactivity of the thyroid gland, and hence

susceptible of treatment by thyroid extract, with improvement and perhaps even cure. He summarizes as follows the effects of thyroid treatment: Increased metabolism, shown by (1) elevation of temperature; (2) increased appetite, with more complete absorption of nitrogenous foods; (3) loss of weight, with nitrogen excreted in excess of that taken in the food; (4) growth of skeleton in the very young; (5) marked improvements in body-nutrition generally; (6) increased activity of mucous membranes, skin, and kidneys. The rheumatic symptoms and the anæmia are not only not relieved, but are most frequently aggravated.

[I have observed the increase of anæmia and the aggravation of rheumatic symptoms mentioned above in a case of goitre complicated with rheumatism in which thyroid tablets were given. The tablets were discontinued and salicylates and iron substituted with good effect.—C. S. W.]

Rie, of Vienna, ²²_{Dec. 5, '94} showed a case of myxœdema in an infant 26 months old; parents and child syphilitic.

Northrup ⁵¹_{Nov., '94} has reported two cases of myxœdema in children,—one a girl 9 years old and the other a boy 12 years old. In the first the symptoms appeared at the age of 9 months, and from this period the child had scarcely developed, not only mentally, but physically, as well. Both were treated with a glycerin extract of sheep's thyroid, of which 1 drachm (4 grammes) represented one gland from a young animal. One minim (0.06 gramme) of this was administered three times a day, the dose being increased 1 minim (0.06 gramme) every second day until the temperature rose, the attempt being made to keep the temperature at a point just below 100° F. (37.8° C.). In the first case the treatment was continued for eighty days and was attended with diminution in the size of the tongue, improved expression of the countenance, ability to take more and varied food, and the acquisition of two teeth. In the second case the treatment was pursued for seventy-six days and the improvement was more noteworthy.

Osler ¹_{Oct. 29, '94} reported the successful treatment of a case of infantile cretinoid myxœdema in which the administration of the thyroid extract produced the happiest results, first, in the entire loss of cretinoid aspect of the child, in improvement in the color and in the general nutrition; secondly, in the rapid development,—the child had grown four inches in height during fourteen months.

Bourneville, of Paris, ¹⁰⁸_{Nov. 1, '95} gave an account of several children suffering from myxœdematous idiocy, in whom the physical and intellectual conditions were greatly benefited by thyroid alimentation.

LEGAL MEDICINE.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

FRANK WINTHROP DRAPER, A.M., M.D.,

ASSOCIATE EDITOR,

BOSTON.

Insanity and Crime.

ONE of the most striking features of the criminal statistics of Great Britain for 1893 ^{June 5, '96} is the high ratio of insanity among the prison population. Broadly speaking, the proportion of prisoners found to be insane while awaiting trial or after conviction was about ten times that prevailing among the general population. The need of lunacy experts in courts of law is thus sufficiently emphasized, and, unless miscarriages of justice are to be willfully persevered in, the example set by the Supreme Court of the District of Columbia in the Schneider case should be followed in all countries purporting to be civilized. The prisoner had murdered his wife and brother-in-law in January, 1892. ⁵⁹ He was tried in March of the same year and condemned to death, no plea of insanity having been put in at the time. The decision was confirmed by a Court of Appeal. In the following fall a stay of proceedings was granted on the ground of alleged insanity. In January, 1893, the Supreme Court ordered that a commission of experts, consisting of A. McLane Hamilton, J. B. Chapin, and C. L. Dana, be constituted, with power to examine the prisoner and also employes and officials of the jail in which he was confined. Counsel for the prisoner was also permitted to secure the services of three experts with authority to make special examinations. After the investigation by the experts had been finished the case was tried before the full bench, but without a jury. The prisoner's counsel brought forward his witnesses, including his medical experts. The examination of the latter was made for the most part by the experts appointed by the court. The prosecuting attorney then presented his evidence in favor of the prisoner's sanity. The whole proceedings lasted over a week. At the end the commission appointed by the court made a report in which they unanimously

reached the conclusion that the prisoner was not insane. The judges, basing their opinion upon the evidence given at the trial and upon the report made by the commission, found the prisoner sane, and he was executed.

Comments upon this new mode of judicial procedure are made by J. B. Chapin, ²⁷⁸_{Nov., '94} one of the commission, and by W. W. Godding and E. N. Brush, who were both experts for the defense, and they all speak, on the whole, favorably of the method. It is suggested that there is no need of such a procedure for the appointment of experts for the defense, and also that there should be opportunity for the prisoner to appeal from the decision of the commission if it is unfavorable to him.

The chief interest in the case, in the opinion of Chapin, lies in the action taken by the court in creating a commission, and in the question whether such a proceeding may become a precedent to be followed in the interests of justice, and one more likely to secure independence of judgment by the medical experts than by following the usual course. A commission may err in its conclusions and the experts also disagree. Doubts and differences are inevitable if two groups of experts testify, but the prisoner's rights must be guarded under all conditions.

In an article on the inebriety of insanity from a medico-legal point of view, T. D. Crothers, of Hartford, Conn., ⁴⁷¹_{Sept., '95} states that the question in any case which comes into legal notice is the presence of insanity or inebriety. Is the inebriety only a symptom and insanity the original cause, or is inebriety the cause and insanity the sequel or result? Whichever condition is prominent, alcohol has injured the brain, disturbed and lessened the sensory nerves, and palsied the centres of perception. The brain is enfeebled and unable to act normally because of false impressions and imperfect power of control.

If the facts of the case indicate some previous change and failure of reason or conduct, and the inebriety is comparatively sudden, it may be considered as a symptom of deeper disturbances. If the inebriety appear after disease, mental or physical shock, or states of extreme exhaustion, it is clearly a symptom. If inebriety come on gradually, associated with exhilaration or unusual depression, grave central brain degenerations are to be expected. If the inebriety is marked by criminal thoughts and conduct foreign to his previous life, the patient's higher brain-centres are breaking down. If the inebriety is of three or more years' duration and has been prominent in frequent intoxications, the insanity is to be inferred, and the possibility of sanity and normal power of reason and control is a fiction unknown in theory or

practical experience. The history and character of the criminal act often give a clear conception of the degenerative brain that executed it. The faults of reasoning and exaggerations and underrating of the results and consequences of acts, with the reckless disregard of the interests of others, are clear evidences of brain-failure. The consideration and final adjustment of these cases and their acts should extend over a sufficiently long period of time to enable the court to be fully acquainted with all the facts at issue. If, in a case of capital crime, the person should be under medical observation for a year or more, his real condition would appear. If the act of such person become a question, the same exhaustive study is essential to reach reasonably accurate conclusions.

Hypnotism in this connection was referred to by Clark Bell.¹⁰⁷
Sept. 15, '95 Can crime be committed under the hypnotic power, the subject being the unconscious and innocent agent and instrument? If the subject is unconscious, and even unwilling, has the hypnotizer such power and domination over the hypnotized as could control action to the extent of the commission of a crime? Is it possible to remove, by hypnotic suggestion, from the mind of the subject all memory of acts or occurrences which happened in the hypnotic state? Bell pointed out that it appeared that the majority of the medical men in this country did not recognize hypnotic trance as an existing fact. The lawyers and judges were on the same ground as the doctors. In the courts of Europe the contrary was the fact, and men of the highest character and professional attainments devoted their best efforts to its study and elucidation.

J. Delboeuf,²⁴¹
Mar., '95 concludes, after a study of hypnosis and criminal suggestions, that the hypnotized subject retains a sufficient amount of intelligence, reason, and liberty to defend himself against the realization of acts irreconcilable with his personal character and habits. While awaiting the results of further research, we should not, in his opinion, be too greatly influenced by what we read in books and, particularly, in the sensational articles published on the subject.

The Czyski case,⁶
Feb. 16, '95 tried in Munich recently, was one of great interest in this connection. The public attorney's indictment accused the prisoner of having violated the lady while in a state of hypnosis. The defendant denied the crime, and asserted that the lady loved him and had married him of her own free will. Czyski's counsel submitted that it would not be possible to deprive a person of will by hypnosis, and medical men were summoned as experts to give evidence to this end. Fuchs, of the

University of Bonn, asserted that hypnosis was unable to annihilate the freedom of will. He had seen hypnotized people in Paris, and was persuaded that they had done what the operator ordered them either to oblige him or to pose as interesting. In short, he held all hypnotism to be a farce. Preyer and Hirt declared that they were of an entirely contrary opinion, but they also said that the Paris experiments quoted by Fuchs did not prove anything, as nearly all the mediums there were drilled for hypnotic performances. The jury finally acquitted Czynski of having violated the lady while in a state of hypnosis, but condemned him to three years' imprisonment for frauds in connection with other elements in the case. Preyer has given his opinion of the verdict in the *Deutsche medicinische Wochenschrift*. He declares himself to be fortified in his view that Czynski not only hypnotized his victim, but also her companion, who had acted as witness at the wedding ceremony, and even the man who impersonated the clergyman. He has come to this result after examination of their signatures to the marriage register, which, he believes, offer some very characteristic signs. He also alludes to a condition in which the person is not really reduced to hypnotic somnolence, but is merely influenced by the strong will of the operator. This state, which he has sometimes seen, especially in people of a weak character, he terms "abulia." The questions involved being of great medico-legal and scientific interest, the various professors called as experts intend to collaborate in producing a pamphlet on the case.

The relation between defective vision and crime was reviewed by Frank Van Fleet. ⁸¹⁴_{Nov. 15, '94} This author believes that, while the influence of heredity in the production of crime is more than doubtful as a factor in criminology, environment, as manifested by defective vision, is of the utmost importance. The proportion of crime and criminals to population is increasing. Education not only increases crime, but causes it, while manual labor diminishes it. "As certain thoughts will be expressed by certain movements of the face,—as grief, joy, recognition, etc., which movements are due to involuntary or reflex muscular actions,—so people who are accustomed to think in certain lines after awhile become to look alike. Physicians resemble each other; lawyers, cobblers, tailors, and, in fact, nearly every class of professional men and artisans, have certain actions and expressions, due to their habits and ways of thinking, that distinguish them one from the other."

W. R. Kynsey ⁶_{Feb. 23, '95} argues that, while the criminal is not necessarily diseased, there generally exists a latent neurotic bias, if not actual neurotic disease,—such as epilepsy, inebriety, or

insanity; and he is frequently scrofulous or tuberculous, all indicating nervous and bodily degeneration. Mentally he can reason about the crimes committed, but he cannot comprehend any moral wrong, and, conscious of punishment for past offenses and almost certain of it for future ones, rushes wildly, heedlessly, remorselessly into the vortex of criminality, and never pauses until the arm of the law interferes to protect society. The author quotes Despine, who, in his exhaustive study of the criminal's mental nature, says: "There must be something abnormal in the disposition of criminals when they yield with the utmost facility to desires which would excite the strongest repugnance and horror in a truly moral man. Does not this abnormal state reveal itself in the clearest manner when, contrary to what poets and moralists have represented, we see the wretch who has committed a crime exhibiting no symptoms of remorse, but rather a disposition to repeat the same criminal act?" Kynsey drew from this the conclusion that the criminal is morally insane, usually incurable, and that he should be treated in the same way as the intellectually insane person.

James G. Kiernan ¹⁹_{Apr. 6, '95} states that a number of points are generally lost sight of or else denied by experts in criminal cases, the result being a decision not in accord with the opinion of the author. Five propositions are given, as follow: 1. Criminal acts committed by the insane often originate in logical motives. 2. Acts committed by the insane for insane reasons are often referred to logical motives. 3. Acts committed by the insane may be the distant outcome of an insane delusion, yet the act be the result of a logical, seemingly sane motive. 4. The execution of decidedly insane projects may be interfered with by a healthy conception. 5. An insane man committing homicide for insane reasons may take due precautions to preserve his life for the execution of delusional projects. The author cites a number of cases showing clearly the full meaning of each of the above propositions, and also how exceedingly apt a jury would be to judge an insane man sane if he acted in certain ways, which, on the contrary, would decide an expert's opinion in the opposite direction.

Punishment.—In an article on the coming rôle of the medical profession in the scientific treatment of crime and criminals, Austin Flint ¹_{Oct. 19, '95} states that, as a member of a commission of investigation of the New York State Reformatory at Elmira, he had ample opportunity of studying the question. This investigation continued for about six months, and during that time he made a careful study of the methods of the institution and the results obtained. These results are most striking and encouraging to

those interested in prison reform. The system involves discharge on parole after a certain period of treatment. In 1887 and 1888 an effort was made to verify the estimates of probable reformation as to 1722 prisoners who had been paroled prior to September 30, 1887. Inquiries in prisons, from relatives, employers, and acquaintances of the men were made. Definite information was received as to 1125 of those paroled. It was found that 78.5 per cent. had not fallen into crime. This would give a percentage of 51.28 known to have been reformed out of a total of 1722 paroled. After six months of satisfactory conduct on parole a prisoner receives an unconditional release.

The reformatory combines within itself a prison, a school of letters, a school of technology, a school of physical training, a series of manufacturing departments, and a military organization. The trade-schools embrace thirty-four different trades, and gave instruction, in 1893-94, to about eighteen hundred inmates. Although carried on primarily for instruction, and not for profit, the manufacturing departments realized \$53,458.47 profit for the year 1892-93. Under the Elmira system no inmate is paroled until he has a situation provided for him and enough money to his credit to support him until he receives his first month's wages. He is under surveillance for six months, and may be returned to the reformatory at any time within these six months should he violate the conditions of his parole. The agencies which operate in bringing about these remarkable results are the following: 1. The indeterminate sentence, which gives hope of release and incites to efforts at reformation on the part of the inmate. 2. The strict and inflexible discipline, including military training. Most inmates have never been taught self-control and have never been subjected to discipline. 3. Physical training, with no opportunity for committing excesses of any kind. 4. Removal from surroundings and associations of a demoralizing character. 5. Education and technical training. Pike, the distinguished author of "History of Crime in England," says: "There is one great preventive for crime, one great antidote to instincts inherited from the past, and that is education." To summarize, a criminal by instinct, his criminality fostered and developed by surroundings, absolutely illiterate, without a trade or means of earning an honest living, with a feeble and vicious physique, may be discharged from the reformatory on parole, physically well and strong, with an education not beyond his station, a skilled mechanic with good employment under honest surroundings. He has six months in which to learn self-reliance, and is then a free man. The Elmira Reformatory well deserves its position as the model institution of its kind.

A. H. Goelet, ⁸¹⁴_{Apr.1,'95} in an article on electrocution, alludes to the controversy that had resulted from the published conclusions of d'Arsonval, ¹⁴_{Nov.28,'94} which have led him to declare that the electric current as employed in the New York State prisons for the infliction of the death-penalty did not produce absolute death, but only a temporary loss of consciousness, and that a subsequent autopsy was necessary to complete the act. He further declared it his belief that resuscitation is possible, and insinuated that the clause requiring an autopsy after electrocution had been added to the bill to make death certain, as it is not certain without it.

D'Arsonval's conclusions were based upon observations made after accidental shocks from electricity, in which cases he demonstrated the possibility of resuscitation. His opinion was further strengthened by the apparently negative results of the official examination of the bodies of the first six criminals executed by electricity at Sing Sing Prison, made for the purpose of determining the mode of death.

To definitely settle the question whether death is instantaneous and absolute, or whether there are any reasonable grounds for the belief that resuscitation is possible after execution by electricity, A. E. Kennelly and the author were asked to serve as scientific witnesses at an execution at Sing Sing Prison and to report the results of their observations. The current was maintained at its maximum, 1740 volts and 8 ampères, for only four seconds, when, to Goelet's mind, death was accomplished, and the subsequent period, fifty-three seconds, during which the pressure was lessened and the current reduced to about 2 ampères, and again increased to 4 ampères before it was finally turned off, was not essential.

Death was instantaneous and apparently painless, which, in fact, must be true, since electricity travels faster than the nerves can transmit painful impulses. There was no sound emitted and no evidence of sensory impressions. The whole body was thrown into a condition of intense tetanic rigidity the instant the current was turned on, which was maintained throughout the contact.

The author quotes a report of the microscopical examination of the blood and tissues of David Hampton, electrocuted January 28, 1895, published by T. E. Oertel, ⁸¹⁴_{Apr.1,'95}. The deductions drawn from his observations are as follow: 1. The chief action of the electric force is upon the blood and the blood-vessels. 2. The red blood-corpuscles have less power of resistance to this force than have the white ones. 3. That one or more of the elements, the presence of which is required for the coagulation of the blood, is by the electric force changed or destroyed. 4. Some germicidal agent is formed in the blood, precluding the continued existence

and multiplication of putrefactive organisms. 5. The liver seems to be the organ, of those examined, most susceptible to the force exerted. 6. Of the organs examined, the lungs offered the most resistance to the force in question. 7. The force exerted is sufficient to rupture the brain-tissues and the smaller vessels of the brain, thus producing universal hæmorrhages into its substance. 8. No destruction of the cellular elements of the tissues seems to have been produced. 9. The deviations from the normal conditions, as noted, are sufficient to produce a lethal result.

From the foregoing observations the conclusions, therefore, are that the electric current, as employed in the New York State prisons for the execution of the death-penalty, produces instantaneous and absolute death, and that resuscitation is impossible; and, furthermore, that death results from destructive lesions directly due to the effect of the current as applied. The author is convinced, we may confidently assert, that the death is painless. If, therefore, murder, as the law declares, shall be expiated by the death-penalty, electricity should be universally adopted as the method of accomplishing this in the most humane manner.

Prevention of Crime.—Lombroso, of Turin, ²¹³_{Dec., '90} expresses his conviction that the systematic study of the characteristics of school-children, physical and mental, would bring about a genuine revolution in the prophylaxis of crime. He points out that the inclinations of the child are almost the same as those of the adult criminal, but usually disappear as age advances. In some instances, however, these characteristics are conspicuous, and continue to be more and more prominent, and in these cases there are associated physical peculiarities; and it is the detection and pointing out of these possible criminals of the future that, Lombroso thinks, the teacher can do so much truly useful work.

Medico-Legal Tests.

Referring to the “stomach-test in murder-trials,” Gustav Liebm⁹⁹_{ann Feb. 28, '96} states that its object is to ascertain, by the presence or absence of solid contents or by the intermediary stages of liquefaction of food found in the stomach, how far the process of digestion has advanced, giving thus a clue as to the time at which the death of the victim has taken place, provided the time of the last meal be known. In order to arrive at an exact, or at least approximately exact, conclusion, the first and imperative condition would be a uniformly established schedule of time in which the different phases of digestion should be completed. If there be such a physiological law from which there is practically no deviation, we should place full reliance upon the test; but if there be, in healthy

people even, numerous exceptions or deviations, the test must of necessity be open to errors. Liebmamr considers that this latter proposition is the true one. The different variations in the duration of the digestive process depend upon the following conditions: 1. The length of time necessary for the transformation of solids into chyme in healthy individuals varies a great deal according to the digestibility of the different foods. 2. The length of time necessary to expel the ingesta from the stomach into the duodenum in the healthy individual varies according to the quantities of food taken. Not only does it take a longer time for larger quantities to be impelled on, but the motor activity of the stomach-walls is diminished by the greater distension produced by the larger amount of food present. Thus, pieces of meat are frequently found a day or longer after ingestion. 3. The shorter or longer stay of food depends on the amount of acidity, which varies in different stomachs even in healthy individuals. 4. Much variation even in health is caused by individuality, by presence or absence of pepsin, hydrochloric acid, psychical factors, and emotions (fright, fear, grief, or the opposite, as joy or exaltation). We see, therefore, that owing to the many physiological variations, which do not permit any reliable deductions even in the healthy, the forensic value of this test must be considerably impaired.

[Admitting much of the foregoing as true, it still remains that observations on the contents of the stomach of the victim of a homicide offer valuable corroborative evidence of the time of death, and that careful attention to the detailed inspection of the gastric contents is a medico-legal duty at an autopsy.—F. W. D.]

Clark Bell, of New York, ⁶_{Apr. 20, '95} in a review of the present position of our knowledge bearing upon the identification of blood-stains, states that in regard to chemical tests—the guaiacum test and the production of crystals by the addition of common salt and glacial acetic acid (Teichmann's crystals)—it is stated that these several tests, while reliable in determining whether the matter examined contains blood or not, are of no value and throw no light whatever upon the question as to whether it was the blood of man or of animals that was examined. The application of the exceedingly delicate instrument, Sorby's spectroscopical eye-piece, is next described, and it is said that by its means the late Professor Richardson, of Philadelphia, was able to detect the three-thousandth part of a grain of blood on an ax-handle supposed to have been used in a case of murder.

In an article on the detection of blood-stains F. Gautier ²⁰⁷_{Nov., '95} states that hydrogen peroxide furnishes a positive test of the absence of blood. The slightest trace of blood, on being wet with

a solution of hydrogen peroxide, instantaneously releases oxygen, the minute bubbles of which may be seen with the unaided eye. These bubbles collect on the surface of the drop, which soon, under a magnifying glass, appears quite foamy with them, and looking white, even to the unaided eye. The technique is very simple. A portion of the suspected blood-substance—a slight scraping is sufficient—is placed on a glass slip, the back of which is covered with black paper. The suspected material is covered with a drop of weak alkaline water and allowed to stand for a few minutes, or until the substance is softened; a drop of peroxide-of-hydrogen solution is then added. If there is the slightest trace of blood present the globules of oxygen instantaneously appear, and they are so characteristic that any confusion of them with air-bubbles is impossible. If the reaction does not occur it is certain demonstration of the absence of blood. Other animal liquids behave in the same manner, however; so that the test is only valuable to demonstrate absence of blood.

Suicide.

Sikorski, of Kief, ⁶_{July, 13, '95} publishes interesting statistics concerning suicide in the different nations of Europe. According to these figures the death-rate from suicide per 1,000,000 living is in Saxony 311, in France 210, in Prussia 133, in Austria 130, in Bavaria 90, in England 66, while in Russia it is as low as 30. Further, it is found that during the last thirty years the suicide-rate has in Russia remained stationary, while in all other European countries it has increased by 30 or 40 per cent.

An editorial writer, ⁶_{Aug. 17, '95} in an article on suicide in its medical and moral aspects, states that the regular, though, happily, never frequent connection between solar heat and this form of crime has been repeatedly observed, and may, without undue straining of logical conditions, be accepted—at all events, as far as it goes—as a working hypothesis founded on accurate observation. He states that Haig ⁶_{Aug. 11, '94} associated mental depression with vascular tension due to uric acid.

F. Antony ²⁴³_{June, '95} states that in Austria suicide is more prevalent in the German provinces than in Carniole, Galicia, and Hungary. In Germany suicide is especially frequent,—in Saxony and the neighboring principalities, as well as in the regions near Denmark. The Slavonic race has but little tendency to suicide; this accounts for the advantageous position occupied in the statistics by the Oriental provinces of the empire. Religious ideas exert a real influence upon this question. Among the Jews there is little suicide, among Catholics it is more frequent, and among Protestants

still more so ; in individuals not belonging to either of these three great religions it attains its majority. The Catholic inhabitants of Rhenish Prussia and of Westphalia come next in order to the Slavic provinces of the East with regard to their weak propensity for self-destruction. The question of religion, however, fails to explain the greater frequency of violent deaths in the majority of the Catholic provinces of Austria, principally lower Austria and Bohemia. It is incumbent upon every one, the author states, to endeavor, in his own sphere, to strengthen moral and religious ideas and to combat the growing tendency to consider suicide not as a crime against humanity, religion, and the State, but as a legitimate act.

In considering the question of suicide as a mental epidemic, Forbes Winslow,⁶¹ in an address read before the Medico-Legal Congress, New York, Sept. 21, '95, September 5, 1895, contended that juries do not pay sufficient attention to the influence of passion in overclouding the understanding. If the notion that in every case of suicide the intellectual or moral faculties are perverted be generally received, it will at once do away with the verdict of *felo-de-se*. Should the jury entertain a doubt as to the presence of derangement,—and such cases may present themselves,—it is their duty, in accordance with the well-known principle of British jurisprudence, to give the person the benefit of that doubt, and thus a verdict of lunacy may be conscientiously returned in every case of this description. The author insists upon the fact that no penal law can act beneficially in preventing self-destruction—first, because it would punish the innocent for the crimes of the guilty, and, secondly, that, owing to insanity being present in every instance, the person determined on suicide is indifferent as to the consequences of his action.

Sudden Death.

Brouardel⁹⁹ June 13, '96 gives a number of causes of sudden death which are little known and, fortunately, extremely rare. Gonorrhœa, for instance, may lead to sudden death. Four or five cases of sudden death from gonorrhœa in the male have been reported in Germany. In France only one case has been reported. The medico-legal autopsy showed a phlebitis in the prostatic venous plexus and pulmonary embolism. Of a similar nature was the case of a girl of 16, upon whom Brouardel performed the autopsy. A gonorrhœa resulted in phlebitis of the veins of the left broad ligament, which was followed by thrombosis of the left iliac vein and fatal embolism.

In a pregnant or a non-pregnant woman, with disease of the adnexa or uterus, an ordinary vaginal examination may be the

cause of sudden death. In addition to a case seen by Brouardel while he was an interne, he has twice seen cases of this sort,—namely, sudden death from vaginal examination in a physician's office. Lovain had a case in which sudden death of a young girl was caused by a vaginal douche given in the treatment of gonorrhœa. It is well to remember that vaginal examination may have a result less grave, but none the less important from the point of view of the physician's responsibility. Tarnier has reported that two women upon whom he had practiced vaginal touch aborted on the same evening, and that neither of them could be suspected of having taken any measures to bring on abortion.

Contagne²¹¹_{Feb. 10, '95} has twice observed sudden death caused by hæmoptoïc pulmonary congestion during the course of chronic and latent affections of the abdominal viscera,—(1) in chronic nephritis and (2) in venous cirrhosis of the liver in a syphilitic subject. These congestions, of which the mechanism is unknown, may be classed with those reported as occurring in internal or hernial strangulation, of which the author cites a new case (in intestinal obstruction) having given rise to a medico-legal autopsy on account of suspected poisoning.

Vibert,³⁴⁶_{Mar., '95} in analyzing the statistics of various authors and those collected by himself relative to sudden death in chronic affections of the heart and aorta, demonstrates that nearly one-half of the persons dying suddenly succumb to a chronic affection of the aorta, having been well borne up to that time, and which suddenly terminates fatally, without any new anatomical lesion having presented itself. The opinions of those who regard aortic insufficiency as a frequent cause of sudden death are refuted by those having had the opportunity of observing a large number of deaths of this nature.

At the sixty-sixth meeting of naturalists and German physicians at Vienna E. Hofmann⁹⁹⁶_{Nov. 10, '94} reported 75 cases of sudden death due to rupture of aneurisms of the basilar arteries, which came under his observation in his laboratory of legal medicine at the General Hospital of Vienna. Among these 75 cases 53 were in women and 22 in men. The author was able to observe the existence of the aneurisms in children under the age of 15 years. The greater number were in men from 40 to 50 years old and in women from 60 to 70. The aneurisms are most frequently situated in the arteries of the Sylvian fissure, next in the carotids, then in the arteria communicans anterior, and finally in the basilar and vertebral arteries. Their size varies from that of the head of a pin to that of a nut or even larger. They represent, in the majority of instances, true ectasias, the basilar arteries in particular being

especially subject to such ectasias, owing to the thinness of their walls. Atheromatous processes play only a secondary rôle.

Signs of Death.

Wischniewski ^{July 27, '95} has made post-mortem examinations of forty-four frozen persons, and in forty instances found hæmorrhages on the mucous membrane of the stomach. These hæmorrhages assumed the appearance of diminutive spots, somewhat raised above the surface of the mucous membrane. They were round or oval in shape, of a dusky or blackish color, and reached the size of a pea. They varied in number from five to a hundred in individual cases. In cases in which the person had died from some other cause and then the body had been frozen the author did not find these hæmorrhages. The appearance of the hæmorrhages was not affected by the condition of the stomach as regards its being full or empty. As experiments, the author froze rats and guinea-pigs and found the same hæmorrhages as in man, but in cats and young dogs frozen to death he did not observe them, but only a general hyperæmia of the gastric mucous membrane. The author considers this sign of medico-legal importance, as significant of death from exposure to cold.

The only positive and absolute signs of death, according to Stocquart, ⁸⁶⁸ ^{Sept. 21, '95} result from putrefaction and reveal themselves in the form of livid spots in various parts of the body, particularly in the lower portions, and by a greenish color of the skin of the abdomen. The time of appearance of these signs varies with the atmospheric condition, age of the patient, and the form of the disease. In 1862 Larcher reported the appearance of a dark spot on the sclerotic, outside the cornea, occurring during the intermediary period between the state of cadaveric rigidity and the beginning of putrefaction. The author has collected the notes of 75 autopsies performed during the three last months of 1891, at the Saint-Jean Hospital, of Brussels, and found that among 72 cases the sclerotic spot was seen in 30 and was absent in the other 40. In the 30 cases in which it existed it was observed seven times within twenty-four hours, fourteen times between the twenty-seventh and the thirty-sixth hour after death, nine times between the thirty-sixth and forty-eighth hour, and once only at the end of the third day. These observations prove that the sclerotic spot is a very variable sign of death, as regards the time of its appearance, and it often comes too late to serve as a practical sign capable of general application.

[This stain is essentially the pioneer of putrefaction.—F. W. D.]

In an article on death from starvation in children Seydel states³¹¹_{B.7,H.3,95; July 6} that the appearances found after death from starvation of young children, such as emptiness and contraction of the stomach and intestine and general wasting, are not sufficiently characteristic to warrant a decision based upon them in medico-legal cases. Children might be fed immediately before death, or the direct cause of death might be, perhaps, suffocation. From repeated examinations Seydel found that in true cases of insufficient nutrition there is great atrophy of the thymus gland; he grants that atrophy of the thymus also occurs in other wasting conditions, but believes that the condition, combined with considerable emaciation and unaccompanied by organic disease of other parts, is a sure sign of wasting from insufficient nourishment.

Achard,¹⁴_{Oct.31,'94} at a meeting of the Société de Biologie, pointed out that when the presence of microbes is demonstrated in the organs of a cadaver it does not at all follow that these microbes existed during life; they may have developed after death. This is a very frequent cause of error. It is even admitted that this invasion of microbes may occur during the period of agony. The author examined the blood and hepatic fluid of forty-nine dying persons, and found microbes only six times in the blood and eight times in the liver; in all the patients there was septicaemia. In the cadaver he found, after twenty-four hours, that microbes were present in the blood of the heart twenty-four times out of forty-nine. The liver was always first affected. Certain conditions influence the cadaveric invasion: 1. Temperature. It was not noted whenever the temperature remained below 15° C. (59° F.); it was constant when the latter was above 24.2° C. (75.6° F.). 2. Cause of death. The cadavers showing putrid foci (eschars, cancerous ulcerations) were very rapidly invaded, as well as those having died of cerebral or protuberential hæmorrhages. The microbe which first invades the organs is the staphylococcus albus; this is also the organism generally found during the period of agony. The bacilli of putrefaction do not invade the organs until some little time after death.

Bezançon³¹_{July 20,'96} has made a study of cadaveric infections and those occurring during the period of agony, which shows how exceedingly difficult and complex the bacteriological diagnosis of diseases really is; it does not suffice to prove the presence of a microbe in the tissues to establish the fact that it was the agent producing the death-causing disease. It is first necessary to eliminate the various causes of error,—passage during life, under the influence of microbial toxins, of the microbes of the digestive tube into the organism; frequent invasion of the viscera during

the period of agony and the first few hours after death, either by the microbes of the disease itself or by commonplace bacteria coming from the intestines, coli bacillus, staphylococcus, proteus ; and, finally, more rapid development of certain vulgar bacteria, which, masking the pathogenic varieties, likewise contribute to dissimulate the true conditions.

Prostitution.

Commence ²²_{May 29, '95} made a comparative statement on the proportion of venereal disease in the French and English armies. In the French army the largest proportion was found in 1875,—i.e., 74 per 1000. In the English army the proportion was, in the same year, 139 per 1000. The highest figure was reached ten years later,—274 per 1000 ; while in the French army the figure stood 52 per 1000,—four-fifths lower. The author concludes that venereal disease is much more frequent in countries where free prostitution exists than in those where it is licensed.

Woods Hutchinson, of Des Moines, ¹¹⁸⁴_{June, '95} says that the results of regulation on prostitution are about as follow: 1. A small diminution in the number of registered prostitutes and a large increase in that of clandestine prostitutes ; the decline of the brothel and the enormous multiplication of the grisette. 2. A marked increase in the number of men indulging in the vice, on account of diminution of fear of infection, and, what is even more potent, removal of all risk of interference by the police, of arrest in some "raid," and the consequent possibility of publicity in the police-court. In short, it puts the stamp of safety and respectability upon the whole business for both sexes. A Parisian or a Viennese "takes a woman" just as naturally and as frankly as a New Yorker or a Londoner takes a cigar or a dinner ; and the prostitute of the former cities has almost as much self-respect and pride of station as the married woman. 3. It diminishes the marriage-rate of the community, makes concubinage, "in some form," safe, popular, and economical. 4. It increases the ratio of illegitimate births through obvious causes. Paris, the Mecca of this system, has the highest illegitimacy-rate in the world,—26 in 100 births, or one-fourth of all. Finally, it does not even diminish venereal disease ; first, because the most fruitful breeding-ground of syphilis and gonorrhœa is not among prostitutes, but among "clandestines,"—so-called seamstresses, water-girls, chamber-maids, etc, and "amateurs" of all descriptions ; and, secondly, because the most rigid and skillful inspection can find no trace of disease in a woman who may develop well-marked primary or secondary symptoms before night-fall and infect a dozen men before morning.

Traumatic Diseases from the Forensic Stand-point.

A. L. Fulton ¹⁰⁹_{May, '96} calls attention to the fact that tuberculosis of bones has formed the basis of suits for damages against railroads, and gives, among other examples, that of a case of Pott's disease in which it was claimed that an injury to the spine, caused in a railroad accident, had produced the disease. The jury in this case, very correctly, accepted the theory of the defense, and wisely found that the disease developed in plaintiff's childhood.

A fact worthy of mention is that tuberculosis producing caries of bone never begins in the compact outer tissue of the shaft of long bones, but is usually observed to commence in the marrow or the less dense, cancellous tissue in the centre of the medullary canal. The fact that the external surfaces of bones are exposed to trauma, while the inner, cancellous tissue and the marrow are not, presupposes that the disease would commence in the former.

Asher, of Leipzig, ²²_{Oct. 2, '95} has an exhaustive article on traumatic diabetes. According to the author, the symptomatology of the traumatic form is identical with the so-called idiopathic. The symptomatology is frequently extended by organic changes or disturbances of a functional nature. The disease may make its first onset on the day of the injury or a shorter or a longer time, even years, after. The traumatic origin of the disease is, however, doubtful after the lapse of from three to five years.

A distinction can be drawn between the disease occurring soon after the receipt of the injury and that which develops in a chronic form. Both acute and chronic traumatic diabetes may pass away or remain stationary. If it remain stationary it may prove fatal in from one to five years. All forms of the disease as met with in idiopathic diabetes are also met with in the traumatic variety. The diagnosis is based on the presence of sugar in the urine in connection with some injury; the examination of the urine is the first step in the recognition of the disease. As proof of a connection between the disease and an injury, it is important to be certain that no diabetes was present previously. Symptoms of previous diabetes should be sought after, such as a broad, thick tongue, softening of the gums, carious teeth, sourness in the mouth, tuberculous or gangrenous affections of the lungs, cardiac weakness, arterio-fibrosis, albuminuria, cataract, etc.; but only the concurrence of a number of these symptoms can give rise to a suspicion of the previous existence of diabetes. The prognosis can only be determined as the case goes on. If after two or three months there is no tendency to improvement it is unfavorable. The capacity for work is not generally diminished at first, but hard work aggravates the disease.

HYGIENE AND EPIDEMIOLOGY.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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HYGIENE.

Alimentation.

Drinking-Water.—In the testing of drinking-waters Kruse⁵⁸_{v.17} attaches great importance to the organoleptic qualities revealed by sight, smell, taste, and temperature. He considers chemical analysis of less value, even almost superfluous as regards practical hygiene. The determination of the hydrometric degree is useful, because the quantity of earthy salts contained in water is of importance, considered from the sanitary stand-point. Certain suspicious circumstances may render the research for metallic poisons necessary; on the other hand, the presence of organic matter may be regarded as inoffensive. The chlorides, nitrates, and sulphates dissolved by the water are not in themselves unhealthy, but there are cases in which their existence leads to the determination of the origin of flow. An ordinary bacteriological examination of a water does not, he thinks, furnish a positive conclusion as to its alimentary qualities. The exact number of germs, of their different varieties, and the presence of microbes indicative of infection by human excrements are so many deceptive criterions.

[The presence of microbes indicative of infection by human excrement may, as the writer says, be deceptive criterions of the actual danger from the use of the water at the time of examination, but the importance of their presence should not be underestimated, since they prove that the bacilli of infectious disease may infect the water through excrement.—W. W.]

On the other hand, the method of bacteriological enumeration is indispensable for the regulation of the functions of filters. The examination for the presence of pathogenic agents, particularly the bacilli of cholera and typhus, is very interesting from a scientific point of view, but one should never wait for the confirmation of

their existence in declaring a water dangerous; the possibility or probability of their presence suffices, as it is now well known that these micro-organisms remain living during a long time in water.

On general principles it is now generally admitted that water which does not contain more than one thousand benign bacteria per cubic centimetre may be accepted for public alimentation. On the contrary, the presence of pathogenic bacteria, even in very small numbers, suffices for the rejection of the water containing them.

G. Sims Woodhead and G. E. Cartwright Wood,²_{Dec. 29, '94} of London, conducted a painstaking inquiry into the relative value of twenty-one varieties of water-filters. The method employed was as follows: The filters were put to work on water holding certain known test-organisms—*staphylococcus pyogenes aureus* and yeast-plants—and allowed to run for four days. Then they were put to work on pathogenic organisms—(1) cholera bacilli and (2) typhoid bacilli—and allowed to run for four days filtering water containing these organisms. The filters were also tested by filtering tap-water for four days. In each case the number of organisms per cubic centimetre of water to be filtered was ascertained and the number of organisms per cubic centimetre in the filtrate at the end of each day. It was found that water-organisms would grow through the filter in from two to four days. The Pasteur-Chamberland and the Porcelaine d'Amiante filters were exceptions to this rule, no water-organisms appearing in the filtrate even after four days' work.

These results are strikingly confirmatory of the experience which has always been furnished in the bacteriological laboratory in regard to the efficiency of these filters in removing pathogenic micro-organisms from water. The influence of the Pasteur-Chamberland filter is also demonstrated by the great reduction of typhoid fever in the French standing army, representing nearly one-half million of men.⁶_{June 1, '95} A recent official report showed that the total number of cases of typhoid fever in 1886 was 7771; it has constantly and progressively fallen since, till in 1894 it was 3060, the majority of the latter being due to the fact that soldiers who possess in their barracks a pure water-supply are none the less exposed to the infection of typhoid fever in inns, public-houses, restaurants, and other public places which they have so many opportunities of frequenting. Thus at Nantes, where typhoid fever had formerly been reduced to isolated attacks, the majority of the 17 cases which occurred in 1893 and the 30 in 1894 were orderlies who took their meals at inns where the water was shown to be contaminated by infiltration of sewage from cess-pools. The same thing occurred at Saint-Germain, La Flèche, Blois, Maubeuge, etc.,

and it may be taken as the best explanation of the sporadic cases which are always found to make up a substantial total, and probably can never be altogether avoided. These results, which are obviously of an eminently practical and satisfactory kind, are of great interest.

Even the Pasteur-Chamberland filters, however, require occasional purification to preserve their efficiency. Guinochet, of Paris, ⁶_{Apr. 20, '95} recommends that the bougies be unmounted, well brushed and rinsed in cold water, and then plunged totally, if possible, for a liberal quarter of an hour in a 1 in 1000 solution of permanganate of potassium. The bougie is then removed from the solution, well shaken, and finally rinsed once more in cold water and replaced in the filtering apparatus. The water that filters through the bougie is at first colored, but after a few minutes' working it becomes quite clear and can be utilized for drinking purposes. This method of sterilization may be employed for porcelain, stone, or asbestos filters, and is said to be as efficient as it is simple, the permanganate sterilizing in the cold every part of the filter. Beyond this, it cleanses the porcelain bougies by oxidizing the glutinous organic matter which chokes the pores. The small quantity of the permanganate that may remain in the pores of the filter after the sterilizing process is over is in nowise hurtful to health. But whatever method of sterilization may be employed, the flow is gradually lessened. Dr. Guinochet found that if after the permanganate process (using this time a 5 per 1000 solution) the same manœuvre be repeated with a 1 in 20 solution of bisulphite of sodium, the normal flow was restored. The bisulphite solution is prepared by adding 50 cubic centimetres ($1\frac{1}{2}$ fluidounces) of a solution (density 1 in 300) of the commercial salt to 950 cubic centimetres (31 fluidounces) of water. It is as well to add to this solution, each time it is used for this purpose, 5 cubic centimetres ($1\frac{1}{4}$ fluidrachms) of ordinary HCl per litre (quart). A Pasteur-Chamberland filter may be permanently kept microbe-free by (1) a daily superficial scrubbing with a brush; (2) a weekly (or biweekly if the water to be filtered be very impure) sterilization with a cold 1 in 1000 permanganate solution; (3) a trimestrial and thorough cleansing with, first, a 5 in 1000 permanganate solution, and then in a 1 in 20 bisulphite solution. As shown by Vallin, ⁴⁴³_{V. 16, No. 11, '94} one should distinguish the agents which regenerate filters—that is to say, re-establish their flow—from those which sterilize,—*i.e.*, destroy the germs which they contain. Permanganate of potassium sterilizes well, but regenerates badly; bisulphite of soda, on the contrary, regenerates perfectly.

Permanganate of lime, according to Bordas and Girard, ¹⁴_{Apr. 3, '96}

appears to be preferable to permanganate of potassium, being a hundred times more active as an antiseptic and even more active than sublimate, while it is neither toxic nor caustic. It may be utilized for the purification of drinking-water, but any excess must be removed and the water rendered colorless by means of an inferior oxide of manganese. The authors are at present experimenting with the bioxide.

Commenting upon Woodhead and Wood's paper, an editorial ⁶_{Jan. 12, '96} recalls the experiments of Percy Frankland, who showed, over eight years ago, that if a water containing bacteria is shaken up with finely-divided solid particles and allowed to subside for several hours, the large solid particles in falling to the bottom carry with them an astonishingly large proportion of the bacteria. Thus, after agitating with chalk, for fifteen minutes, a water containing originally 8000 micro-organisms per cubic centimetre, it contained only 270 organisms,—a reduction equal to 97 per cent. Coke-powder gave even a better result, for, in a water containing innumerable organisms before treatment, there were found absolutely none at all after subsidence of the coke-particles, the reduction effected being therefore equal to 100 per cent. Similarly, animal charcoal effected a reduction of 99 per cent., the original water containing 8000 and after subsidence only 60 organisms per cubic centimetre. Vegetable charcoal, again, reduced the number from 3000 to 120, which is equal to a reduction of 96 per cent. There are strong reasons for believing, then, that, by the simple expedient of agitating water—say, with well-burnt powdered coke—and drawing off the water after the particles have subsided, it would be freed from its organized and, it may be, its disease-producing inhabitants. This process appears certainly to be as simple as filtration, and should give very little trouble in its practical working; moreover, it cannot surely be costly. Coke, unless well burnt, would probably impart a foreign taste to the water, which, however, could be removed by passing the water through a filter containing an oxidizing medium, in which case the filter need not be an efficient remover of organisms, since after the subsidence treatment there should be none to remove. The suggestion is made that this method should be tried in the place of established methods of purification which, in the light of recent research, have been shown to fail. Friedel, of Paris, ⁹⁹_{May 23, '96} recommends a new disinfectant, "monol," by which it is possible to render swamp-water, or even water impregnated with vegetable poisons, pure, palatable, and harmless.

A simple and efficient method is highly recommended by Meillère, of Paris. ⁶_{Jan. 26, '96} Four drops of the tincture of iodine of

the French Codex sterilize in a few minutes one litre (quart) of spring-water, all pathogenic micro-organisms being destroyed. For ordinary household use the author states that the best method of sterilizing water is to prepare with it an infusion of tea, limes, or hops. The iodine method may be advantageously employed by travelers.

Frémont ³¹_{Feb. 23, '96} has succeeded in proving experimentally that water maintained for twenty minutes at a temperature of 80° C. (176° F.) loses all the pathogenic micro-organisms it may have contained without being deprived of its gases and without involving any precipitation of the contained salts. It is stated that the flavor of the water is in nowise modified by the process,—a most important consideration.

According to Teich ⁹³⁰_{May, '96} ¹_{Aug. 24, '96} the alum process of sterilizing water almost always diminishes the number of germs; still, this is only temporary, for an increase soon results. Typhoid bacteria are not harmed by the process, which must not be relied upon to effect their certain removal from the water. Although alum can destroy cholera bacilli in time, the process is a slow one, lasting more than a day. Hence the alum process is practically worthless.

Oppermann ⁹³⁰_{V. 4, No. 19, p. 865} ¹²⁶_{July 15, '96} has made experimental researches as to the possibility of applying the processes of electrolysis of Hermite and of Webster to the purification of drinking-waters. He found that Hermite's process was perfectly capable of sterilizing water, provided that the electrolyzed water contained an unusual proportion of chlorides; but the excess of chlorine was difficult to eliminate. The latter might be transformed into a chloride of calcium and subsequently be treated with sulphate of sodium; but, although deprived of all its germs, this water could not be used for drinking nor even for domestic purposes, for it would merely be a weak saline solution, and not pure water. The results are no better with Webster's process, which must considerably modify the normal composition of the water by extracting important elements and replacing them by ferruginous products. Oppermann also tried another (American) process based upon the use of one iron and one carbon electrode, but the results were even less satisfactory than with the preceding method. He then undertook experiments to determine the most practical method of electrolysis. He found, however, that electrolyzed water is not fit for drinking-purposes, owing to its very unpleasant taste and the vomiting it occasions. Besides, it is not very clear and cannot be subjected to filtering, owing to the danger of again becoming contaminated. In order to do away with the unpleasant taste and odor, prolonged boiling being inefficacious, it must be left standing

from eight to fifteen days,—another rather impracticable procedure. The author finds, on the other hand, that electrical heating to 96° C. (205° F.) suffices to render this water drinkable, although precipitating its earthy carbonates. This fact, which is merely of scientific interest, nevertheless led him to a truly practical result. Remembering the remarkable properties of alum for the clarification of water, the author conceived the idea of relieving the electrolyzed water of its excess of ozone by subjecting it to a new electrolysis with aluminium electrodes. All the necessary operations may be gone through with in half an hour, and the result, according to the author, is perfect. Oppermann is also convinced that germs of cholera and of typhoid fever contained in the water would surely be destroyed.

In order to more quickly expose the pathogenic bacteria and to eliminate the benign varieties, Ausset, of Limoges, ^{Jan. 30, '95} uses liquefied gelose cooled to a temperature of 40° C. (104° F.), into which is poured the desired sample to be tested. This substance eliminates three-fourths of the benign bacteria. He also employs gelose with the addition of lactose or litmus, which, by the red coloring imparted to this fluid by certain microbes (*bacterium coli*), greatly simplifies the bacteriological examination.

A. C. Houston, of Edinburgh, ^{Nov., '94} reports a case showing that the mere depth of a well does not necessarily afford evidence of the purity of its water. A spring which, on chemical analysis, was found to yield a pure and potable water, had a well sunk at its site, six feet in diameter and one hundred and fourteen feet deep. The water from this well was found to be pure. A bore was then made, two and one-half inches in diameter and one hundred and eighty feet deep; the water was again analyzed and found to contain organic impurity. The rock between a quarry receiving sewage and the well consisted of sandstone, dipping toward the well, the difference of level being sixty feet. At the end of the year 1892 sewage was no longer run into the quarry, but into the Edinburgh city drains, and in July, 1893, the well was found to yield a pure water. It had probably been polluted by this sewage, coming from a distance through fissures in the sandstone, almost unaltered, and grossly contaminating the water.

Hankin, ^{Feb. 9, '95} states that, although lime has, in one or two cases, been used, with apparent success, for the disinfection of wells, in checking the progress of cholera epidemics, it cannot be recommended as a general mode of dealing with the subject of epidemics, first, because it is of no use unless it is perfectly fresh, and, secondly, because it kills frogs, the water acquiring a putrid taste some days after the addition of lime. He prefers potassium

permanganate, personal experiments having shown that this substance possesses almost a specific action on the microbe of cholera. In some wells in the village of Balrampur, India, whose water contained from three thousand to ten thousand microbes per cubic centimetre, including the cholera microbe, this microbe completely vanished on the addition of permanganate. This fact is remarkable, in that when their water was examined, three days after treatment, it still contained from two thousand to three thousand various other microbes per cubic centimetre. In the town of Shaligunj, during a cholera epidemic, half the wells were treated with permanganate and the other half were not medicated. In each case the cholera microbe vanished from the water after the addition of permanganate.

H. Cayley, of Netley, Eng., ^{Feb. 16, '95} reports instances of the apparent distribution of disease through the medium of sand-filters, such as are commonly used in India. Cholera having broken out in one of two regiments, the sources of general supply were found to be free from cholera vibrios. After passing through the filter-tanks from which the infected regiment drew its supply, however, the water was found to contain vibrios. The sand with which the filter-tanks had been recharged was said to have been procured from the banks of a river not far from a station from which the natives came to bathe, to obey the calls of nature, etc., and in which cholera was reigning. The supply from the filter-tanks being shut off, the disease ceased at once among the soldiers.

Regional Water-Supplies.—According to Andreas Meyer, ³⁸⁶ _{V. 26, p. 593} Hamburg now possesses the finest arrangements in existence for the physical purification of drinking-water, and a brief description of them may prove of service to communities having improvement in this direction in view. The water is first freed of all the grosser impurities, remaining from fifteen to twenty hours in decantation basins, each having a superficial area of 4200 square metres and a depth of 3.5 metres. Only the two upper metres of water are sent to the filters, the lower layer being emptied with the substances deposited therein. The filtering basins, having each a superficial extent of 7650 metres, are open above, and contain a filtering layer of 1.6 metres (3½ feet), composed below of coarse gravel, then fine gravel as middle layer, and sand on top. This layer of sand is 1 metre deep; the water above is 1.1 metres (3 feet 4 inches) deep. From time to time one of the basins is isolated from service and the upper layer of sand is removed, washed, and strained on the spot. When, after repeated removals, this upper layer is reduced to 40 centimetres (16 inches), new sand is added to the original height of 1 metre (3 feet 3½ inches).

[The sand is washed with filtered water.—W. W.]

The water distributions of Worms and Magdeburg are provided with a new system of filters, devised by Fischer.⁹³⁰ While retaining sand as the filtering medium, he converts it into stones by the aid of a mixture of a double silicate of soda and of potassium. He thus forms compressed plates having a superficial surface of 1 square metre and a thickness of 18 to 20 centimetres (about 8 inches), having in the centre a cavity of 2 centimetres ($\frac{3}{4}$ inch) in depth, in which the filtered water collects. These plaques are baked in a temperature of 100° to 200° C. (212° to 392° F.). The filters thus composed occupy eight times less surface than the sand, and procure an economy of 40 per cent. After their revivification (restoration of a free flow), which consists simply in reversing the current of water and causing it to ascend instead of to descend, these filters operate more quickly than sand-filters, because their texture is more dense. Finally, being composed of distinct elements, those which work poorly are more easily recognized, and they may be cleansed without interfering with the working of the rest of the filter.

Shuttleworth,²⁰¹¹
Oct. 4, '94; Dec. 1, '94 states that the normal number of bacteria to the cubic centimetre in the parts of Lake Ontario two or more miles from shore is about one hundred. Because of sedimentation, the largest number is found near the bottom. The best position for the new (Toronto) intake was decided to be twenty feet from the bottom. The number of bacteria was, as elsewhere, larger in the cold than in the warm seasons of the year.

Speaking of intermittent filtration of Merrimac River water, Fuller,²⁰¹¹
Oct. 4, '94; Dec. 1, '94 says that it is absolutely essential with sewage, and also, at times, with certain waters, that the pores of the filter be charged with oxygen from time to time. During 1893 it was found that an average of 98.54 per cent. of the bacteria present in the river-water were removed by the filtration. Of those that got through (or appeared in the filtered water), the majority belonged to the most hardy forms of water bacteria, and from one-seventh to one-fourth of them were present in the very resistant form of spores. When typhoid and other faecal bacilli were applied they could get through, but only in much more limited numbers than ordinary water varieties.

F. A. Forel,²⁰⁸
Nov. 17, '94 studied the value of the water of the Lake of Geneva for alimentation. As regards pathogenic microbes, the mass of lake-water in which they are disseminated is enormous; they do not multiply, the water being too pure and too cold to be at all comparable with a culture-bouillon. Finally, they are eaten by other organisms, if they do not die a natural death.

Taken at a depth of from twenty-five to thirty metres, far

away from any local cause of pollution, the Lake of Geneva forms a perfect water-supply for alimentation,—a fact of no mean importance to the many sufferers who frequent Montreux, Evian, Lausanne, etc.

In the water of the Lake of Zurich, Kleiber²¹⁴_{No. 18, p. 578, '96} found 42 varieties of microbe,—7 micrococci and 35 bacilli. He was only able to positively identify 23; in 15 the identification was more or less doubtful, and 4 appeared to be new. The presence of the bacillus coli communis is explained by the drainage from the surrounding inhabited districts.

The author finds that, for the isolation of the benign bacillus coli, the addition of 1 per cent. of carbolic acid to the soil, as indicated by Péré,²⁶²_{No. 2, '91} is insufficient, 2 per cent. being required to kill all other aquatic microbes.

Bread.—In a bacteriological inquiry regarding the pathogenic properties of bread, Walsh and Waldo, of London,⁶_{Oct. 20, '94} made gelatin cultures from the centre of a number of loaves of recently-baked London bread and found therein thirteen different species of micro-organisms. The average maximum temperature reached by the centre of a quartern loaf in the oven is from 163.4° to 186.4° F. (72.6° to 86.1° C.), and of a half-quartern loaf is from 186.8° to 203° F. (86.3° to 95° C.). These figures are much below those derived from studies of continental bread as shown by J. L. Hamilton, of Brighton,⁶_{Dec. 8, '94} who recalls the work of Balland and Masson, published some time ago,³_{No. 70, '93} wherein the results of their research into the temperatures in French military-made bread and biscuits are given. They found that the internal temperature of French army-bread ranged between 212° and 216° F. (100° to 102.2° C.), whilst Paris-baked biscuits reached 236° F. (113.3° C.). These chemists therefore consider that with the acidity of the dough in each case these breads and biscuits are sterilized by the heat employed. Hence, concludes Hamilton, “owing to their using a higher temperature, French bread is much more healthy, tasty, and soluble than the damp, doughy, indigestible abominations turned out by British bakeries, which may possibly harbor undestroyed pathogenic microbes and their spores.” He showed experimentally, however, that, like meat, the interior of a loaf continues to cook while the exterior is cooling, a rise of 18° F. (10° C.) having been noted in one of the experimental loaves five and a half hours after it had been removed from the oven. Reasoning by analogy, Walsh and Waldo infer that disease-producing organisms can remain alive in the interior of a baked loaf. Many cases of choleraic diarrhœa and similar troubles seem to some to be traceable only to deteriorated or bad bread. Hence

moist, sour loaves should be rejected. They also attach importance to the fact that unwholesome bakeries are exposed to infection by pathogenic bacteria,—*e.g.*, typhoid fever in sewage,—and that such bacteria may gain entrance to the dough and maintain their vitality after baking, by analogy with what has been shown to occur in the case of non-pathogenic bacteria. If these premises be true, it follows that pathogenic organisms may, under certain circumstances, be distributed in loaves and so produce specific disease among consumers.

Stroebel and Decaut, army-surgeons, ²_{Dec. 15, '94} studied the question of preserving biscuits from attack by insects, and ascertained that biscuits must be made between September 15th and May 15th; during this period the eggs are not hatched. The biscuits must be packed in tin boxes well soldered, and the soldered sides must be covered with paper. The depots must be kept antiseptically clean and their walls must be scraped and brushed over with coal-tar mixed with petroleum between April 15th and May 8th. The floor must be washed with potassium in order to kill the insects that burst from the eggs. The insects must be caught by strings covered with treacle and honey between May 15th and September 15th. These parasites, like most others, are not affected by a low temperature, but die when exposed to a high temperature.

Milk.—Under the auspices of the Massachusetts Society for Promoting Agriculture, our associate editor, Harold C. Ernst, of Boston, assisted by H. Jackson and L. Frothingham, ⁵⁹_{Apr. 6, '95} undertook an investigation of the subject of the infectiousness of milk. One hundred and twenty-one microscopical examinations of milk and cream were made, the specimens coming from thirty-six different animals. Bacilli were found in the milk from twelve animals,—*i.e.*, one-third of the total. These animals were all infected with tuberculosis, but their udders were free from disease.

In addition to this, 88 guinea-pigs were inoculated with the milk from 15 cows, and tuberculosis developed in 12 of them. Six out of the 15 cows communicated the disease. Milk-feeding experiments were made upon rabbits, pigs, and calves. About 4 per cent. of the rabbits, 50 per cent. of the pigs, and 33 per cent. of the calves became infected.

An investigation was also made of the general milk-supply of Boston. Among 33 samples from various sources, tubercle bacilli were found once; and among 25 rabbits inoculated with milk from mixed sources, 3 became infected. One may infer from this that of the general milk-supply of a large city 3 per cent. or upward of the samples will contain bacilli and prove infectious.

The last branch of the inquiry was clinical in character.

Circulars were sent to 1800 medical men and veterinarians, asking if they knew of any cases in which human beings had been infected with tuberculosis through the milk of cows. Among 1013 replies from physicians, 893 were negative, 11 reported cases of infection by cows' milk, and 8 reported cases of infection of a child by the mother. The veterinarians gave much more striking evidence. Among 54 replies, 14 reported positive and 9 suspicious cases. These results furnish ample ground for the most scrutinizing attention by boards of health to the subject of the milk-supply of the community.

Lewi and Koplik, of New York, ^{Feb. 9, '95} after a careful study of the quantity of the milk-supply of the tenement-house districts of New York City, came to the conclusion that both in winter and summer the ordinary commercial milk, upon its arrival in the city, is within the incubation period; that this stage lasts twenty-four hours in winter, thirteen to seventeen on a fairly cold day, and five hours on a hot summer day after reaching the city. The author, therefore, believes that, if prepared (sterilized) early in the day, the ordinary milk of commerce is suitable for infant-feeding.

Further experiments were made to test the value of pasteurization as a preservative process. On a warm summer day pasteurized milk had a fairly stationary acidity for ten or twelve hours, the acidity then rising slowly until at the end of twenty-four hours the milk was curdled. The growth of the bacterium lactis was thus retarded about six hours as compared with unpasteurized milk. On the other hand, sterilization at 90° to 92° C. (194° to 197.8° F.) for forty minutes, while rendering the milk far from absolutely sterile, rendered the bacterium lactis inert for two days at least at a summer temperature. It may therefore be concluded that, without subsequent refrigeration, pasteurization in summer does not offer a safe method of preparing milk for infant-feeding. This agrees with the earlier observations of Bitter and the recently expressed view of Flügge, ⁵⁸_{p. 272, '94} that milk pasteurized at the dairy must, upon reaching the city, be treated as unpasteurized, as far as its adaptation to infant-feeding is concerned.

According to several authors fresh milk possesses bactericide properties. Hesse and Weigmann declare that the comma bacillus perishes in fresh milk in less than twelve hours. On the other hand, Kitasato, Heim, and Uffelman have demonstrated that comma bacilli, having remained in milk from one to six days, were still living at the end of that time. Basenau ⁵⁸³_{May 18, '95}; ³_{July 3, '95} undertook further researches upon this subject in the laboratory of Forster, in Amsterdam, and considers himself justified in formulating the following conclusions: Fresh milk *does not* possess any bactericide

properties with regard to the comma bacillus. The bacilli of cholera remain living in fresh milk containing but very few microbes during thirty-eight hours and up to the time of coagulation; they may also multiply under the same conditions. In a milk rich in bacteria the bacillus of Koch is still alive after thirty-two hours, and even after coagulation.

A further source of disappointment is afforded by M. Sterling,⁵⁵¹ Jan. 26, Feb. 2, '95 who states that the microbes in milk resist the usual sterilization, even by the processes of Soxhlet and Flügge, on account of their spores. In some cases the presence of microbes, having escaped sterilization, can only be determined at the end of twenty-four hours. Among the aërobic varieties which resist the ordinary sterilization, some are always found which peptonize the albumen. The author distinguishes five varieties, which he calls *bacillus lactis peptonans* α , β , γ , δ , ϵ . These bacilli are analogous to those isolated by Flügge and Buijwid. It is probable that the gastro-intestinal troubles observed after the use of certain sterilized milks depend upon the peptones produced by these bacilli. He therefore concludes that the expensive methods of sterilization of milk furnish no especial guarantee, and that one may content one's self by boiling the milk in a clean vessel, and then keeping it at a temperature of 16° C. (61° F.). Milk containing peptone is very often in no way distinguishable from the normal milk, though at other times it has a bitter taste. Peptone is more readily formed in sterilized than in fresh milk. The peptonizing bacilli act directly upon the albumen without the aid of a ferment. These facts render prophylactic measures all the more important. It is generally held that the typhoid infection of milk is due to contaminated water used for washing the milk-vessels or for augmenting the bulk of the milk by fraudulent additions. Edmunds, of London,² Sept. 22, '94 believes that an escape of faecal matter from the cow while being milked quite often falls into the milk-pail, and that this is generally the real cause of typhoid infection in milk. He has seen this to occur when inspecting dairies and examining suspected cows, and is perfectly sure that it often takes place. To him the polluted-water theory seems to be far-fetched and quite inadequate.

A much more frequent source of pollution is emphasized by Rowland, of London,² Aug. 3, '95 who conducted a series of elaborate examinations of the milk-supply of that city. In twenty-five samples of milk examined bacteriologically, the average number of bacilli found per cubic centimetre was 5000, equal to a little less than 2,000,000 per drachm. This is somewhat less than the number found in other investigations which have been made. That the

number of bacteria found was so great is not to be wondered at, since Sedgwick found 30,500 microbes per cubic centimetre, or 122,000 per drachm, in freshly-drawn milk. As to the origin of this large number of bacteria, the author states that it can easily be imagined when one recalls the usual condition of the cows in even the cleanest and most hygienically managed of our dairies. The stable or cow-shed in which the milking is usually carried on is itself saturated with excremental matter, the very straw the animals stand upon being often but an incubating ground for micro-organisms. Warmed by fermentation and saturated with faecal matter, it offers all the conditions of warmth and nutriment material for their best growth. The restlessness of the animals and the walking of the milkman disturb at each moment myriads of these micro-organisms, some of which, passing into the open pail, find in the warm milk all the conditions for life and active multiplication. That this is not an exaggerated picture will be evident when we state that fully 90 per cent. of the organisms found are bacilli coli commune, the common inhabitants of all excremental matter. Other sources of infection are to be found in the dirty hands of the milker, unclean dairy-utensils, and the insecurity and carelessness commonly employed for the transit of the milk from the dairy to the consumer. Rowland concludes: 1. That all milking be carried on in the open air, the animals and operators standing on a material which is capable of being thoroughly washed, such as a floor of concrete or cement. Such a floor could be easily laid down in any convenient place which can be found. The site chosen should be removed from inhabited parts as far as possible, and should be provided with a plentiful water-supply. Only in this way does it seem possible to avoid the initial contamination with the colon bacillus. 2. That greater care be expended on the personal cleanliness of the cows. The only too familiar picture of the animal's hind-quarters, flanks, and sides being thickly plastered with mud and faeces is one that should be common no longer. It would not be difficult to carry out this change; indeed, in the better managed of our large dairy companies' farms such a condition no longer prevails, but in the smaller farms it is but too frequently met with. 3. That the hands of the milker be thoroughly washed before the operation of milking is commenced, and that after once being washed they be not again employed in handling the cow otherwise than in the necessary operation of milking. Any such handling should be succeeded by another washing in fresh water before again commencing to milk. 4. That all milk-venders' shops should be kept far cleaner than is often the case at present. That all milk-retailing shops should be compelled to

provide proper storage accommodation, and that the counters, etc., should be tiled.

That these measures, supplemented by strict municipal surveillance, are urgently needed was shown by the tables of S. C. Busey and George M. Kober, of Washington, ⁵⁹ June 15, '95, in which 134 epidemics of typhoid fever, 73 of scarlet fever, and 27 cases of diphtheria are clearly traced to milk infection.

As regards municipal surveillance, an example that all commonwealths should follow was recently given by the city of Philadelphia, ⁹⁹ Nov. 29, '94, where the Board of Health has instructed the chief inspector of milk to indorse as untrustworthy all certificates testifying to the freedom of herds of milch-cows from tuberculosis that are not based upon the use of the tuberculin-test by trained veterinarians. A register is to be kept in which shall be recorded all herds of milch-cows that supply the city of Philadelphia that have been certified as free from tuberculosis by the method approved by the Board of Health, as well as such as have not been reliably certified, and which are to be designated as "suspicious." These records shall also contain the names of dealers supplied from the various herds, and shall be open to the inspection of the public. All producers of milk supplying the city of Philadelphia who fail, after sixty days' notice, to furnish a certificate or clean bill of health of their cattle, based on the method of examination demanded by experts and approved by the Board of Health, shall be reported to the board and be liable to have their milk rejected as being suspicious.

Kenwood, of Newington, Eng., ² Aug. 31, '95 recommended careful examination of all milch-cows at short intervals, preferably once a week, the prompt isolation of those animals likely to furnish infective milk, and the adoption of means that would deter the cow-keeper from mixing the milk of such animals with other milk. He also dwelt on the necessity for the appointment of special inspectors of cows and cow-sheds, and the necessity for such inspectors to notify at once all cases of suspicious disease in cows to the medical officer of health.

As regards tuberculous infection of milk, E. P. Niles, of Blacksburg, Va., ⁸¹ Sept., '94, from personal experiments with tuberculin, finds that it is the only means whereby tuberculosis can be diagnosed in animals. Physical examination may show well-marked cases of the disease in a dairy or herd, but the latent forms cannot possibly be thus detected. With tuberculin properly used, however, it is possible to detect tuberculosis early enough to eradicate it, and thus make the milk of cows so affected comparatively safe for man and animals dependent upon a fluid diet. This point was

discussed by Bang, at Budapest, ²⁰¹²_{Dec., '94; Aug. 24, '95}, who has not only made a large number of tuberculin injections and performed more than one hundred and fifty autopsies of animals that had received injections, but who also knows intimately the results of an equal number made by other experts. Over 9 per cent. of all these post-mortem examinations failed to confirm the diagnosis. Two-thirds of these unsatisfactory results seemed due to too small doses or conditions of fatigue, etc. In some autopsies tuberculous deposits (especially small and calcified ones) were recognized, and yet the employment of tuberculin during life had given no reaction. The reaction failed, in many positive cases, on testing by a second injection, made even a year after the first one. Hence it is not well to rely upon the first injection, and Bang does not, therefore, advise the slaughter of slightly-tuberculous cows, and would allow them to breed. The majority of them are affected in but a very slight degree, and might for years bring forth calves wholly free from tuberculosis. Recovery from the disease may take place; for Bang states that he has very often found small and perfectly-calcified tubercular deposits in aged cows. He made autopsies on twenty foetal and newly-born calves, but never found the disease transmitted to the foetus unless the mother was in a very advanced tuberculous state and the disease generalized. The calf is always born healthy when the cow that bears it is but slightly affected. Hence, cows that appear healthy, in spite of their having tuberculosis, should be allowed to breed, but ought to be kept apart from perfectly healthy animals. Their calves must be removed from the infected sheds immediately after birth, and the milk that they receive must have been cooked, for the corroborated results of these autopsies showed that the majority of the tuberculous calves were infected through the alimentary canal, presumably by the raw milk. For two days after birth the colostral milk is needed, but it is safest after being heated to about 150° F. Bang's elaborate experiments with great herds show that newborn calves will develop into healthy cattle if separated at once from their slightly-tuberculous mothers, fed only with sterilized milk, and kept in perfectly-clean quarters.

The objections to the use of tuberculin as a diagnostic aid were discussed by Hess, of Bern, ³⁸⁶_{No. 27, '95}, who declared that the use of tuberculin was attended with danger to the health of cattle. He had frequently noticed that, after injection, the beasts showed extreme depression, lessened appetite, and diminished milk yield. The worst objection to its use is the tendency to produce fresh recurrences of the disease of an acute miliary type, while otherwise it would remain entirely latent and quiet in chalky centres.

While Hess regards tuberculin as a valuable diagnostic means, he considers it unreliable in tuberculosis that is advanced. These views were contradicted by Nocard, Ostertag, Bang, and others, who pronounced tuberculin harmless, or nearly so.

Meat.—M. Van Ermengem ³_{July 3, '95} studied the causes of a series of poisonings by veal. He gives the following conclusions: The meat which gives rise to accidents is generally furnished by animals hastily killed on account of illness. These accidents are due to the pathogenic micro-organisms and the toxins which these meats contain, and that are caused by the disease from which the animal suffered. Spoiled or tainted meat, when furnished by healthy animals, rarely gives rise to frequent and serious accidents. Benign putrefaction probably plays merely a secondary rôle in the genesis of the morbid troubles in question.

The diseased meat causing the greatest number of accidents is taken from animals presenting pyæmic and septicæmic inflammatory processes, or attacked by affections having the characteristics of pneumo-enteritis. These accidents frequently occur after the ingestion of chopped meats. This food is especially dangerous because it is generally prepared with the viscera—in which the pathogenic micro-organisms are particularly abundant—and because it is capable of easy and lengthy preservation, and the microbes and toxins have been able to multiply therein. In order to avoid all danger of accidents which diseased meat, notwithstanding its normal appearance, may give rise to, he advises to enforce the immediate destruction or burial of the viscera, unused fragments, etc., whatever their state of preservation; to require the sale of the meat on the spot; to prohibit the manufacture of potted meats with diseased meat which, nevertheless, appears admissible; to recommend a bacteriological examination of the meat in suspicious cases.

According to Vallin, of Paris, ²²_{June 3, '95} two of the most virulent diseases from which calves perish are acute septic pyæmia consecutive to phlebitis of the cord and septic diarrhœa. In the case of the former malady the autopsy reveals the presence of deep suppurations of the organs, metastatic abscesses, and pus in the veins. In chronic cases the duration of the affection permits the infiltration of the flesh of ptomaines and other micro-organisms that cooking does not modify; consequently, from six to twenty-four hours after ingestion of the meat symptoms of cholera nostras set in, which in some cases have ended in death. Similar effects are produced where the animal died from septic diarrhœa.

Austin Peters ⁵_{Sept., '95} states that slaughter-house statistics show that tuberculosis is rarely found in calves killed for veal and in

steers and oxen killed for beef. It is almost unknown among our Western bees, and is chiefly met with in cows slaughtered for food, most frequently among dairy-cows from the outskirts of large cities and towns, particularly among the older cows. The two great predisposing causes are overcrowding in unsanitary stables and the depleting influences of lactation. The records of the Copenhagen slaughter-houses²⁰¹³ show the following totals for four years, 1890-93, inclusive: Of 132,294 beef-cattle, 23,305 showed tubercle,—17.70 per cent.; of 8292 swine, 1272 showed tubercle,—15.30 per cent.; of 185,765 calves, 369 showed tubercle,—0.2 per cent.; of 337,014 sheep, 1 showed tubercle,—0.0003 per cent. The records of the Berlin slaughter-houses for 1892-93 show as follows: Of 142,874 beef-cattle, 21,603 showed tubercle,—15.1 per cent.; of 518,073 swine, 7055 showed tubercle,—1.55 per cent.; of 108,348 calves, 125 showed tubercle,—0.11 per cent.; of 355,949 sheep, 15 showed tubercle,—0.004 per cent.

Alluding to the statement recently made that pork was a frequent cause of cancer, Bauby¹⁴_{Oct. 14, '94} states that the pig is rarely attacked by this disease, but principally by sarcoma. Pork-eaters are not more subject to cancer than others, and, reciprocally, cancerous subjects are not particularly persons nourished with pork. In the vicinity of Toulouse the country may be divided into two regions: that of the plains, where vegetables and beef and mutton are used, and that of the mountains, where much pork is eaten. Cancer is much more frequent in the plains than in the mountains, where very few neoplasms are met with. Cats fed exclusively with pork grew thin and died; at the autopsy no cancerous localization was found.

In Continental Europe horse-flesh is frequently substituted for other meats. Humbert,⁷⁴⁷_{Jan. 31, '96} basing himself upon the works of Brautigam and Edelman, made several experiments with a clinical process for recognizing horse-meat, and gives the following results: Whatever be the variety of meat to be tested, the method of research always consists of three separate processes: 1. Fifty grammes (1½ ounces) of muscular tissue cut into small pieces are boiled for one hour in 200 grammes (6½ fluidounces) of water. 2. The liquid thus obtained is first cooled and nitric acid is then added; it is then filtered. 3. Finally, the bouillon thus obtained is placed in a test-tube and treated with a saturated solution of iodine, prepared while hot. In pouring the solution drop by drop, one obtains, with horse-meat, a more or less dark circle of a violet-red color, which is entirely absent with beef, veal, pork, or mutton. Humbert simplifies this *modus operandi* by directly treating the bouillon with the solution, before adding the nitric acid and filter-

ing. If, for the saturated solution, the iodo-iodide solution of Gram be substituted, the coloring is more intense. This process enables one not only to precisely recognize horse-meat, but also to reveal its presence when mixed with other meats.

In the report of the Royal Commission on Tuberculosis, ^{2013; 5}_{Sept., '95} the commissioners state explicitly that tuberculosis is the same disease in man and in the food-animals, regardless of differences in its manifestations and regardless of its origin in tuberculous food or otherwise. Experiments on the effects of feeding pigs, guinea-pigs, and rabbits, on uncooked milk and meat from tuberculous animals proved that the disease will thus be caused in a large percentage of the subjects used. In these experiments no particular examination for actual tubercle in the food-material was made, but care was taken to avoid any obvious mass of tubercle. Control experiments with animals kept under similar conditions, but receiving no tuberculous food, gave negative results. Uncooked tuberculous matter (meat from tuberculous animals and material containing tuberculous matter recognized as such) produced the disease in 8 pigs, 5 cats, 56 out of 84 guinea-pigs, and 8 out of 10 calves that were fed with it.

Tuberculous matter in food is found principally in the organs of the animals, while in muscle and muscle-juice the bacilli are very seldom met with. But the meat may become contaminated from the actual tuberculous lesions present in other parts of the carcass, by the hands, knives, and cloths of the butcher during the process of slaying and dressing. The greater the amount of tubercle in the animal, the more the likelihood of this contamination; and since, when meat is infective, it is commonly so by reason of accidental contamination with tuberculous material, it follows that more depends on the care taken in guarding against contamination than on anything else.

According to Austin Peters ⁹⁹_{p. 325} tuberculosis is the only one of the great bovine scourges existing in the United States, and many States, especially in the East, have taken steps to eradicate this one. In New York, in districts where the herds are made up largely of hardy grades of the Ayrshire, Holstein, and short-horn families, about 1 per cent. of the cows are tuberculous; while in districts where more cattle of the Channel-Island breeds are found, between 2 and 3 per cent. are tuberculous. In Eastern Massachusetts it is much more frequent than this.

Legge ⁹⁹_{Apr. 17, '95} states that England is about twenty years behind the Continental cities in this matter. It is unnecessary to estimate how much behind some of our own American States would be placed; but the subject has its interest in connection with bills to

promote or hinder inspection of food-products now or lately before State Legislatures. In Paris the seizure of meat is considered justified and is made (1) when deprived of all edible qualities; (2) when the eating of it might be followed by injurious consequences; (3) when from some reason or other it has derived qualities rendering its taste repugnant. Under the first head comes the flesh of animals that have been killed too young, and of those that are either dropsical or cachectic; under the second, that of animals affected with disease, such as fever, septicæmia, anthrax, tuberculosis, etc. The signs which guide the inspector in condemning the flesh of cachectic animals are chiefly the wasted condition, the absence of fat about the omentum, and the lack of resistance in the muscular tissue. With regard to animals that have died of inflammatory diseases the signs are: 1. A general tarnished coloration, more or less deep red. 2. A capillary injection of the fat, which in extreme cases is penetrated deeply by it. 3. Arborescent markings on and a tendency to a livid coloration of the serous membranes. 4. A violet tint of the kidneys. 5. A brown or blackish coloration of the spongy bone, seen best in the vertebræ. 6. Loss of firmness in the muscular tissue. In Brussels the conditions under which the flesh of tuberculous animals is seized, no matter how good its general condition, are: 1. (*a*) Tubercle having its seat in both thorax and abdomen; (*b*) tubercle, whether it be thoracic or abdominal, with presence of tubercles in any other part of the body outside these cavities; (*c*) tubercle generalized in the following organs,—lungs, pleuræ, peritoneum, liver, or mesenteric glands; (*d*) tubercle of the lungs or pericardium involving the pleura extensively; (*e*) tubercle of any organ of the abdomen involving the peritoneum extensively. 2. Tubercle observed in no matter what part of the body, or what the number of tubercles, when the animal is markedly wasted.

No slaughtering can take place in Berlin except at the abattoir, and no meat can be sent away from the abattoir without first being stamped as having passed the expert examination. The inspection is entirely in the hands of veterinary surgeons. They make first a rough inspection of the carcass and cut into the glands of the neck, especially the retropharyngeal. The liver and lungs of every animal must also be cut into by the veterinary surgeon. If the appearances are suspicious, he further examines the spleen and the various glands of the body. The flesh of all animals affected with tubercle, but not so extensively as to justify total seizure, and of those in which only a few cysticerci are found, is cooked for two hours in boiling water, and twice a week sold to the poor for a trifle.

In Copenhagen, also, a slaughter of animals can take place only at the slaughter-house, where the veterinary inspection also is made. All the animals are first inspected as they stand in the market, and any animal found with dangerous infectious disease is isolated and slaughtered apart from the others. None of the organs may be removed until the veterinary surgeon has been his rounds. The latter, after a general inspection of the carcass, cuts into the glands of the neck, examines the pleuræ, peritoneum, lungs and liver, and, should there be nothing wrong with them, allows the meat to be stamped with a blue mark, as of good quality. If he find any inflammation or suppuration about them, he undertakes a methodical examination not only of those of the neck, but also of the submaxillary, axillary, bronchial, mesenteric, inguinal, and lumbar glands. Cysticerci are always looked for by cutting into the muscles at the root of the tongue. Tubercle, when generalized, is deemed a sufficient cause for seizure, but not when localized. A black stamp is freely used to mark meat as of second-class quality which is not considered sufficiently diseased to warrant total seizure.

Oysters.—The question of the transmission of typhoid fever through the medium of oysters has called forth a large number of communications, all tending to demonstrate, beyond a doubt, that, in the majority of instances, the infection is derived from the fact that the oyster, after its removal from its native bank, is kept alive in sewer-contaminated water for some time before it is sold. The filthy condition of oyster-bars and chop-houses is also considered as an element of infection.

The access of crude sewage to oyster-beds constitutes a standing danger, says an editorial writer,²_{Feb. 2, '95} although years may pass without any actual or recognizable injury resulting, for the presence of enteric evacuations, the vitality of the microbes, and their retention in the body of the animal or in the water inclosed between its valves are doubtless indispensable. A difference, however, should be made between breeding-grounds and fattening-beds, for if the oysters have been laid out for several months, remote from all chance of defilement, it matters little under what conditions they were prior to their removal. This distinction, however, is not strictly observed in practice, the breeding-ground being frequently resorted to for supplying the demands of excursionists and other less fastidious customers.

As the result of an inquiry by the Medical Department of the Local Government Board,²_{Apr. 20, '95} into the conditions under which oysters and other shell-fish were cultivated and stored around the English coasts, Thorne showed, in his report, that, taking Grimsby

and Cleethorpes, at the mouth of the Humber, as the apex of a triangle the sides of which pass through York and Leicester, respectively, these lines include thirty-four of the fifty places attacked by cholera in England during the year 1893.

Several typical cases are given which had occurred in localities where cholera had not already existed, some of which were rapidly fatal. The report concludes as follows: "One thing is certain: oysters and shell-fish, both at the mouth of the Humber and at other points along the English coast-line, are at times so grown and stored that they must of necessity be periodically bathed in sewage more or less dilute; oysters have more than once appeared to serve as the medium for communicating disease, such as enteric fever, to man; and so long as conditions exist such as those with which the oyster-trade of Cleethorpes and Grimsby is shown to be associated,—conditions which may at any time involve risk of the fouling of such shell-fish with the excreta of persons suffering from diseases of the type of cholera and enteric fever,—so long will it be impossible to assert that their use as an article of diet is not concerned in the production of diseases of the class in question."

Disinfection.

Dwellings and Wearing-Apparel.—Absolute disinfection, scientifically demonstrated, is considered to be difficult of attainment, and new methods of disinfection of dwellings and articles of furniture merit careful study. E. de Pradel, ³¹_{July 13, '95} having observed four cases of diphtheria, of which two were fatal, in an apartment that had been several times disinfected, ascribes the inefficiency of the disinfection to two causes, the first being the fact that the disinfectors disinfect each article found in the rooms without moving it. If, for instance, there is a wardrobe anywhere, it is carefully sprinkled all over the front and sides, and the drawers and interior are also carefully sprinkled, but the portion facing the wall, and forming with it a sort of recess, in which all the dust and all the microbes in the apartment are found united, is religiously neglected. The disinfectors usually disinfect a room without disturbing the furniture. If, with an excess of zeal, they do occasionally go so far as to move a bureau into the centre of the room and to sprinkle it on all sides, they will never be seen to take down a picture to disinfect the back or to sprinkle the wall behind it. The disinfection thus carried out cannot be effectual; angles, cornices, ornaments of stoves and fire-places, projections and recesses should receive attention as well as other surfaces more exposed to view. The second cause which renders the disinfections

insufficient is the system itself,—that of pulverization. A complete application by means of a brush or disinfection by antiseptic vapors would, in his opinion, undoubtedly give much better results. Miguel⁴⁹¹_{Jan., '95} studied the disinfecting power of vapors emitted by decolorizing chlorides. He noted the great increase of this power through the acidification obtained, for instance, in causing a stream of hydrochloric acid (contained in a bottle with a glass stop-cock adapted to an inferior tubulure) to flow slowly upon chlorides of alkaline bases placed in a recipient in the middle of a room to be disinfected; 4 or 5 grammes (1 to 1½ drachms) per cubic metre of the vapors thus obtained are sufficient to radically destroy the ordinary and pathogenic bacteria. He then studied the comparative disinfecting power of the vapors spontaneously disengaged from the two chlorides most frequently employed,—the chlorides of lime and of sodium. As regards the hypochloride of lime, it is only when in the fluid state, and applied with a brush, that it produces its maximum action upon the germs, and this when it is not evaporated, which very frequently happens, and when it has not lost the greater part of its chlorine. The vapors arising from dry—that is to say, solid—chloride of lime have but relatively little microbicide power, and this substance should therefore be rejected as a medium of disinfection. While the hypochlorite of soda acts as an excellent disinfectant when employed in painting and washing floors, the vapors which it gives off, even at an ordinary temperature, are likewise very powerful bactericides.

As a substitute for sulphurous acid, now commonly used in the disinfection of rooms and articles of wearing-apparel after the occurrence of infectious disease, Berlioz and Trillat some time ago proposed the use of formol or formaldehyde. Bardet²⁹⁶_{June 8, '95}⁶_{July 20, '95} has recently undertaken a series of experiments in conjunction with Trillat which appear to show that the substance in question, when prepared in considerable quantity and disengaged in a room, or even in one of the rooms of a house where all the internal doors are open, is a perfectly safe and efficacious disinfectant. They found that by the use of an apparatus converting one litre of methylic alcohol into formol per hour for six hours a set of rooms with a capacity of three hundred cubic metres could be absolutely disinfected, and this without the slightest deleterious effect upon furniture or other articles contained in the rooms, a few hours' ventilation being sufficient to restore all the contents of the rooms to their original condition. The authors injected animals with cultures obtained from pieces of woollen, cotton, or other fabric which had been previously impregnated with various forms of virus

and then subjected to the action of formol after various periods, but no deleterious results ensued.

Gambier and Brochet ⁸⁷⁹_{Feb., '96, p. 120}; ⁶_{May 18, '96} state that formyl aldehyd is capable of radically sterilizing all dust-germs, as also the anthrax bacillus and its spores, and this even when employed in minute doses, provided that the room be hermetically sealed and that the duration of the process be sufficiently prolonged. Experiments conducted in a room of seventy-five cubic metres were less conclusive than those made in the laboratory. Nevertheless, a relatively small quantity of aldehyd gas brought about the destruction of nearly all the dust-germs deposited in the room. An increase in the volume of the gas used did not appear to produce appreciably better results. The resisting germ was invariably the bacillus subtilis of hay. The penetrating properties of the gas are shown by the fact that dust placed to the depth of one centimetre in beakers, themselves placed on shelves in a cupboard, was found, after an exposure of twenty hours to the aldehyd vapor, to be completely sterilized. It would, then, appear that the employment of this valuable disinfecting agent is specially indicated in the case of breakable or precious objects, and also in the case of rooms which are not too large. Its great advantage over the sublimate spray is that the objects to be purified need not be displaced unless it be bedding, carpets, and curtains, which are better disinfected in an oven. It has been noticed that any germs that have escaped destruction at a first operation are destroyed at a second. Formyl-aldehyd lamps are employed for the generation of the gas.

M. Broca ³⁶³_{Jan. 19, '96} insists upon the necessity of instituting houses of convalescence for children attacked by contagious diseases, and, in particular, for diphtheritis leaving the hospitals with the saliva still virulent. The germs are frequently not negative before the fifth or sixth week, and diphtheria patients leave the hospital at about the eighteenth day. H. S. Anders, of Philadelphia, ¹⁹_{Oct. 13, '94} calls attention to the need of prophylaxis in churches by the adoption of individual communion-cups.

Sick-Room.—H. Vincent has studied the comparative value of various chemical disinfectants. ²⁶²_{Jan., '96} The experiments were made upon fluid matter or substances diluted in urine: 1. Recent normal stools dissolved in urine to a semiliquid consistency. 2. The same stools, old and putrefied, mixed, in some cases, with water resulting from the irrigations of garden-soil, in order to increase the difficulty of disinfection. 3. Fresh or old typhoid stools, with the addition, for greater certainty, of cultures of Eberth's bacillus. 4. Diarrhœic stools to which were added one-tenth their volume of a culture-bouillon of a very active cholera bacillus from India.

The pathological stools, which are usually very fluid and which contain pathogenic micro-organisms of less resisting power than the saprogenic, are more easily disinfected than the normal faecal matter, of which the consistency and the microbial composition offer a greater resistance to the action of antiseptics. With the normal stools disinfection is obtained in twenty-four hours with sulphate of copper, in the proportion of 6 kilos (13 pounds) for 1 cubic metre; for the disinfection of the typhoid stools and the destruction of the bacillus of Eberth the proportion may be reduced to 5 kilos (11 pounds) per cubic metre, and for matter containing the cholera bacillus to about 3 kilos (6½ pounds) per cubic metre. In the two latter cases disinfection is accomplished in twelve hours. The author furnishes the following classification of the various disinfectants of normal faecal matter, recent or putrefied, and the minimum quantities necessary for each of them. The substances are arranged in the order of decreasing energy:—

Position According to Energy as Disinfectant.	Nature of Disinfectant.	Deodorizing Power.	Quantity of Disinfectant Necessary to Disinfect 1000 c.c. of Faecal Matter in Twenty-four Hours.	Quantity of Disinfectant Necessary per Individual and per Day.	Cost per Kilo.	Outlay per Cubic Metre of Matter to be Disinfected.
1st.	Sulphate of copper.	Passable.	7 to 8.5 grms.	12 to 14.4 grms.	0 fr. 46	4 fr.
2d.	Cresyl.	Very good.	9 to 10 "	15 to 17 "	1 " 50	15 "
3d.	Lysol.	Fair.	10 "	17 "	2 " "	20 "
4th.	Chloride of lime.	Very good.	10 to 16.7 "	17 to 28.3 "	0 " 29	4 " 83
5th.	Solveol.	Fair.	11 to 12 "	18.71 to 20.4 "	6 " "	72 "
6th.	Solutol.	Fair.	12 "	20 "	" "	" "
7th.	Soda.	Fair.	12 "	34 "	2 " "	24 "
8th.	Potassium.	Fair.	20 "	51 "	2 " "	40 "
9th.	Carbolic acid.	Good.	30 "	340 "	3 " 20	96 "
10th.	Javel water.	Good.	200 "	425 "	0 " 10	20 "
11th.	Labarraque solution.	Good.	250 "	170 "	0 " 20	25 "
12th.	Lime.	Passable.	100 "	" "	" "	" "
13th.	Chloride of zinc.	Very good.	Over 150 centigr.	Over 225 "	0 " 30	45 "
14th.	Heavy coal-oil.	Very good.	Over 200 grms.	Over 340 "	0 " 30	60 "
15th.	Corrosive sublimate 1 per 1000 with 5 grammes of hydrochloric acid per 1000 added.	Medium.	" "	" "	" "	" "

To sum up, chloride of zinc, heavy coal-oil, and corrosive sublimate are entirely insufficient; carbolic acid destroys the greater part of the saprogenic organisms, but kills the bacillus coli with difficulty. The best disinfectant is the sulphate of copper, which is, unfortunately, a poor deodorizer. There seems to be no parallelism between antiseptic and deodorizing power. The efficacy of the disinfectants varies with the number and nature of

the microbes. The addition of mineral acids greatly strengthens the disinfecting power, particularly of sulphate of copper and chloride of zinc, as well as the fluidity of the matter and the temperature, the antiseptic power increasing with the latter.

Sulphate of copper, acidified with sulphuric acid, is the best disinfecting agent for typhoid stools. For cholera stools cresyl is the best disinfectant, but acidified sulphate of copper is also excellent and better for old stools. It is well to note that there is no similarity in the action of disinfectants upon the microbes in stools and upon the same microbes in bouillon cultures. In the latter case chloride of lime has proved most energetic.

Meillièr⁶⁷³_{Mar., '96} recommends the following disinfectant for the sick-room: Sulphate of zinc, 1000 grammes (2 pounds); sulphuric acid, 5 to 10 cubic centimetres ($1\frac{1}{4}$ to $2\frac{1}{2}$ fluidrachms); essence of mirbane (nitrobenzol), 2 cubic centimetres ($\frac{1}{2}$ fluidrachm); coloring matter, *e.g.*, indigo blue, 0.15 gramme ($\frac{1}{4}$ grain). Place about 5 grammes ($1\frac{1}{4}$ drachms) in the bed-pan before using. Contact with the urine or liquid stools determines prompt solution of this salt, deodorization and sterilization being instantaneous. The excreta are also thus preserved for microscopical examination.

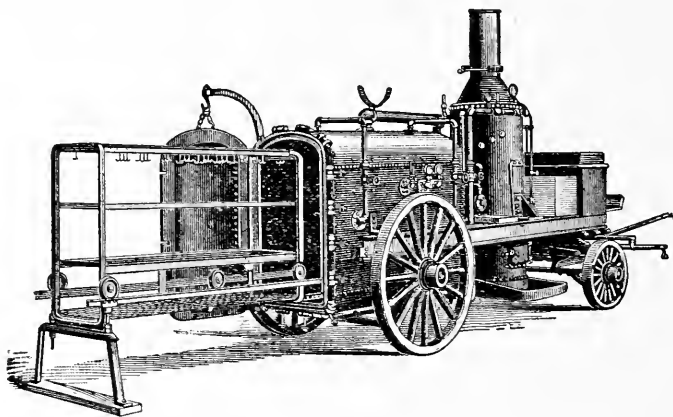
Thomas Fletcher, of Grappenhall,²_{Dec. 15, '94} states that, if a few drops of eucalyptus-oil are sprinkled over the water in the pan of any ordinary water-closet before it is used, the smell of the fæces disappears entirely. The oil of eucalyptus having the property of spreading instantly over water in a thin film, anything dropped into the water is at once coated with this film, which prevents any other odor that might arise.

Portable Disinfectors.—In the "Annual Report of the Surgeon-General of the Marine-Hospital Service" for 1894, page 224, there is a full description of a new, portable, disinfecting apparatus for steam and sulphur disinfection, designed for the use of the service in its operations in the suppression of epidemics. The designer furnishes the following description of each apparatus:—

The portable steam disinfecter consists, as seen by cut, of a beam frame mounted upon running-gear, carrying the chamber, pump, coal and water tank, and the locker-box seat. The chamber is composed of double steel shells with door at one end, handled by a crane attached to chamber itself, and has removable track, with stand adjustable for the irregularities of the roadway, with a galvanized car of size to take single or double mattresses. The piping is arranged to give thorough control of the steam circulation, and has reducing valve, thermometer, vacuum and pressure gauges and safety valve. The boiler and pump are easy of access for working, and arranged as compactly as possible. This apparatus

may be kept at the hospital or other convenient place for stationary use, or hauled to infected district in case of epidemic.

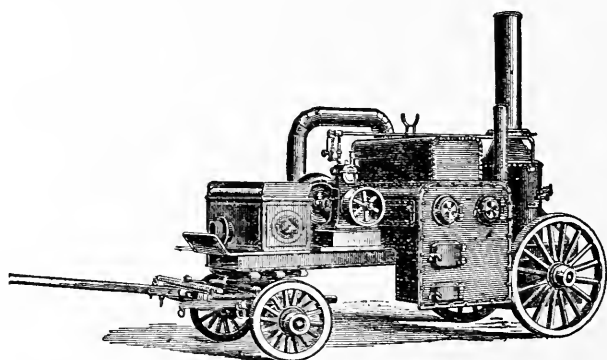
The portable sulphur fumigator consists, as seen by cut, of a beam frame mounted upon running gear, carrying the furnace,



PORTABLE STEAM DISINFECTOR.

Report of the Surgeon-General of the U. S. Marine-Hospital Service.

boiler, engine, fan, coal and water tank, and locker-box seat. The furnace is of special design, with fire and smoke-box at one end, the sulphur being held in cast-iron pan, the dioxid fumes, upon being generated, traveling the full length of furnace and return,



PORTABLE SULPHUR FUMIGATOR.

Report of the Surgeon-General of the U. S. Marine-Hospital Service.

thence to reservoir on top, arranged with baffle plates, from which it is sucked by fan run by rapid-speed engine.

To continue the operation without opening the doors and causing rapid combustion, a double-winged stoker is provided, by which additional sulphur can be introduced into the pan. Two

lengths of hose of special construction are also provided to convey the fumes into the building being fumigated.

Soil.

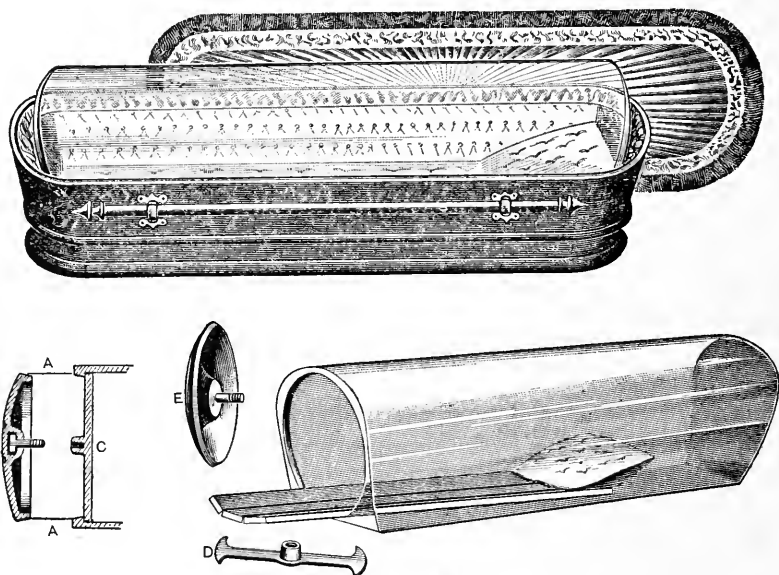
Auger, of Bolbec, ²¹²_{Nov, 10, '94} shows the danger of contagion, particularly of typhoid fever, caused by the practice of spreading faecal matter over the surface of the soil. It is generally believed that the transmission of typhoid fever usually occurs through drinking-water to the extent of 90 per cent. of the cases, while the transmission by the air charged with germs only causes 10 per cent. Auger considers that this proportion, which may be correct for large cities, is no longer so in smaller towns and in the country. It is in the country that the accumulations of detritus and of infected matter produced by large cities are spread about over the ground without the slightest precaution. He cites a number of epidemics in which it was impossible to determine any other factor than the atmosphere. All products should, he thinks, be disinfected before being made use of for agricultural purposes. All the microbes would thus be destroyed, which would surely be preferable to placing them upon the ground to contaminate springs, or to be carried about by the air and to poison entire regions.

James B. Young ⁶_{Mar. 22, '96} gives the results of some experiments undertaken by him on the chemical and bacteriological condition of soil, with special reference to the soil of grave-yards. He points out that so far as his experiments have gone they tend to show that burial has little, if any, effect in increasing the organic matter in the upper layers of the soil, whereas it has a marked effect on the layers containing the coffins,—*i.e.*, at depths greater than four feet or thereabouts from the surface. The organic nitrogen and carbon in grave-yard soil are, the writer remarks, by no means so great in amount as is commonly supposed, and he considers that if burial is properly conducted in suitable soil there need be no risk to the health of communities.

To thoroughly prevent soil-contamination, Julian P. Hill, of Buffalo, N. Y., ¹⁷⁰_{Aug., '96} recommends the burial casket shown in the engraving. It is constructed of glass and forms a cylinder with a flattened base, closed at one end; at the other, a circular opening, into which fits a circular end-piece (*E*). The edges (*A*) of the end-piece are ground, fitting snugly into the circular opening, and it is held securely by being screwed into a cross-bar (*C* and *D*) placed on the inside of the casket. The remains are placed upon a properly-draped slab and then introduced into the casket; the end-piece is screwed into the cross-bar, the ground surfaces

come into contact, and the body is preserved in an air-tight compartment for burial. If desired, the glass casket may be placed in the ordinary wooden case, as shown in the illustration. It is light and cheap, and prevents emanations from the body while it is exposed to view or transported to the cemetery,—an important consideration in times of epidemic.

The influenza epidemics having been ascribed in Paris to the wood-pavement of many of its streets, H. Miquel⁶_{Apr. 27, '96} showed experimentally that wood-paving is not so deleterious to public health as has been represented. A decigramme of sawdust was collected from the bottom of a hole bored into the wood-pavement



SANITARY BURIAL CASKET. (HILL.)

Buffalo Medical and Surgical Journal.

by means of a drill sterilized in a flame and then allowed to cool, the sawdust was diluted with 100 cubic centimetres ($3\frac{1}{4}$ fluid-ounces) of sterilized water, and the mixture sown on nutritive gelatin, the number of colonies being counted at the end of thirty days of culture at a temperature of 20° to 22° C. (68° to 71.6° F.). Newly-laid pavement composed of pine-blocks was found to yield a dust at a depth of 3 centimetres which gave 650 germs per gramme ($15\frac{1}{2}$ grains) of dust, or rather less than one per milligramme. Pavements laid six, eight, or nine years ago were likewise examined, care being, in this case, taken to remove by previous scraping, to a depth of 1 or 2 millimetres, the superficial

crust developed by the traffic. In pavement composed of Landes pine and laid in 1887, 1 gramme ($15\frac{1}{2}$ grains) of sawdust at the surface produced 1,400,000 bacteria. At a depth of 5 centimetres this number had diminished to 4200. In pitch-pine pavement laid in 1889 the superficial sawdust yielded per gramme ($15\frac{1}{2}$ grains) 1,004,000 bacteria, whereas at a depth of 2 centimetres only 500 were found. In the same way pavement laid in 1886 gave at the surface 1,365,000 germs per gramme ($15\frac{1}{2}$ grains) and 4200 and 3100 at depths of 2 and 5 centimetres, respectively, proving that wood-pavement does not allow any penetration of germs, which remain adherent to the superficial layers. Paris mud, dried at a temperature of 30° to 35° C. (86° to 95° F.), yields an average per gramme of pulverized mud of from 40,000,000 to 50,000,000 bacteria.

Atmosphere.

Foveau de Courmelles ¹⁴_{Apr. 21, '96} has studied, with the assistance of numerous correspondents, the influence of ozone in the development of epidemics, and reached the following conclusions: 1. Ozone is always produced in the atmosphere or in our laboratories under the action of exterior forces,—heat or electricity, preferably the latter. 2. The artificial and the natural ozones appear to act in the same manner. Physiologically, excess of ozone kills small animals by the production of congestive phenomena. An active circulation is the first function which is attacked. The absence of ozone acts in a contrary manner. 3. From physiological experiments concerning the co-existence of cholera in connection with but a small proportion of ozone, of the grippe with a large proportion of ozone, the atmosphere justifies the conclusion that there are causal co-relations. 4. The quantity of ozone contained in the air differs according to the heat and the direction of the wind; it would thus seem possible to establish a maximum for each point of territory, and to thus determine the zones of epidemiological attenuation or violence. Meteorology and hygiene should therefore mutually aid one another. 5. An excess of ozone may be combated in the organism by the ingestion or inhalation of alkalines, its absence by that of acids.

H. Herbert, of the British army, ⁶_{Jan. 12, '96} alluding to India, thinks that atmospheric temperature and pressure are, in a sense, antagonistic in their influence on cholera. Both high temperature and high barometric pressure are favorable to cholera prevalence, but a high temperature lowers the barometric pressure; consequently the pressure influence is not seen in the regular seasonal cholera changes, and even the effects of the variations from normal

of atmospheric pressure are only well seen in parts of India where the temperature anomalies are small. The effect of temperature on the cholera organism is best judged in places where the water-supply is from wells. In tanks the result is complicated by the effect of shrinkage in volume of the water. As regards atmospheric pressure, Hardie, in Queensland, found the same relation between pressure and typhoid fever as had the author in Bombay between pressure and cholera.

Special Measures to Limit Spread of Tuberculosis.

The multiple drastic measures proposed and enacted in some countries, for the purpose of limiting if possible the spread of this disease, have called forth a number of articles in which the hardships that would be imposed upon sufferers were the views of many sanitarians carried into effect are depicted. A. Ransom, of London, ⁹⁰_{Jan., '95} in an earnest article, thus portrays the results of many proposed regulations: "A consumptive patient would be considered like a leper in olden days,—one to be separated from his family, to be isolated, shut up. He would have to live months—nay, years—in a tent; his clothes should be destroyed, and, whether he dies or recovers, the house which he has inhabited should be burned. It would, perhaps, be a charity to mankind to kill him at once, like an animal attacked with rinderpest; for, as the duration of the ordinary forms of phthisis may extend over years, during that period every time he breathed he would be filling the atmosphere with the germs of disease, wafted by the winds to be scattered far and near." Lopes Vieira, of Coimbra, Spain, ³_{Apr. 3, '95} regards the method of obligatory declaration adopted in some countries and the isolation of the patient from society as an egotistical and cruel prophylaxis. The truth probably is, that exaggeration is gradually doing useful work, and on both sides. The criminal neglect of communities and private individuals needs fear, or what Ransom calls "The Consumption Scare," as a counterpoise; the energetic humanitarians who seek to protect their fellow-men need such comparison as Ransom's to temper their zeal and open their eyes to broader views. To consider tuberculosis as an infectious disease in the general sense is to attribute to it a danger it does not possess. To enact sanitary legislation upon such a basis is as unjust to the sufferer as it is to the general public. The labors of recent years have clearly shown that dried tuberculous sputum was almost the sole cause of the extension of pulmonary phthisis, and that by preventing the sputum from drying and becoming dust an efficient prophylaxis of tuberculosis was possible. Cornet, of Berlin, ⁴_{May 20, '96}; ¹⁵_{July, '96} pointed

out that micro-organisms with a moist surface could not be detached by a stream of air passing over them, and exploded the idea that the breath was the source of infection in pulmonary tuberculosis, making clear at the same time that it must be looked for in the excretions from the patient. He proved that the bacillus showed its earliest and widest development at its point of entrance into the organism or in the corresponding lymph-glands, and that in man the lungs and bronchial glands formed this point in a large majority of cases. Cornet gives statistics showing the mortality from tuberculosis in the prisons of Prussia and Bavaria. The figures in both countries show much the same proportion from 1881 to 1887. Since 1887, when measures to counteract the propagation by sputum were inaugurated, the rate in Prussian prisons has fallen very rapidly, and in the period 1892-94 reached 81.2 per 10,000 inmates,—nearly one-half the former figure. These prophylactic measures are not, however, generally adopted, and in Bavaria the view of Bollinger, that predisposition is a potent factor in tuberculosis (now exploded) has interfered considerably with their adoption. Cornet's ideas having lately made progress, the figures which had remained stationary up to 1891 have begun to show a reduction. Similar results are obtained from asylums: a fall from 184 to 150—*i.e.*, about one-sixth—is seen in Prussia, while no reduction takes place in Bavaria. In the Catholic nursing orders of Prussia the disposal of the sputum has been attended to with great care, and, in consequence, during the last six years a decided improvement is shown; while in 1887 the rate stood at 100 in 10,000, in 1893-94 it had sunk to 67. Going into larger figures, Cornet quotes those issued by the Royal Statistical Bureau of Prussia. From the year 1875, when reliable information was first obtained, to 1887, the death-rate from tuberculosis averaged 31 in 10,000 inhabitants. Since the latter year a slight reduction has been observed, and from year to year it has sunk to 25 in 1893. Stated generally, there were in Prussia alone, between the years 1887 and 1893, 70,000 fewer deaths from tuberculosis than were expected from the average of the previous years. A similar decrease has been noticed in Hamburg, where precautionary measures have been instituted, and a comparison made with towns which have not adopted them shows that in the latter little or no decrease in the mortality from tuberculosis has occurred.

These figures speak for themselves; they indicate the path to be followed if justice to all concerned is to be the ultimate end. The question of the propriety of officially recognizing and treating tuberculosis as a communicable disease is just now agitating both

the health authorities and the medical profession in this country. The Michigan State Board of Health requires notification and registration of cases of consumption, but does not insist on isolation. The Pennsylvania State Board of Health is considering the advisability of issuing similar orders. The Board of Health of the City of New York has—instead of adopting registration—recommended that physicians and other persons, to whom the knowledge of a case of tuberculosis may come, be requested to report to the Health Department all such cases within seven days of the time when such sick persons come within their observation. (See section A, vol. i.)

EPIDEMIOLOGY.

Small-pox.

Hervieux¹⁴_{Oct. 24, '94} called the attention of the Paris Académie de Médecine to the fact that small-pox had been suppressed in Paris for two months, thanks to multiple revaccinations. Such a result had not been produced for fifteen years, and it was due to the application, on a large scale, of the system of revaccinations practiced in the numerous vaccination services organized in Paris. The prophylactic influence of revaccination is known, but the rapidity with which, in this particular case, the epidemic of last year has been arrested shows that the care exercised in these revaccinations was an important element in the rapid disappearance of the epidemic. Animal vaccine was the only kind employed.

In an article entitled "Some Lessons to be Learned from an Epidemic of Small-pox in an Unvaccinated Community," Joseph Priestley, of Leicester,⁵¹_{June, '96} states that among 362 children but one-fourth were vaccinated. There were 347 cases of small-pox, and among them was not a single case of a vaccinated child under 10 years of age. Fourteen showed forcibly the beneficial effects of vaccination extending into adult life. The average length of the stay in the hospital of the unvaccinated cases was 44.2 days, that of the vaccinated 28.6 days,—a difference of more than 15 days. Among the vaccinated the percentage of the severe attacks was 11.20, against 88.70 for the unvaccinated cases. In nearly two-thirds of the unvaccinated cases complications arose in the course of the disease. Of the vaccinated and the revaccinated less than one-fourth were complicated.

L. Vaillard, of Val-de-Grâce,²⁴³_{Nov., '94} has found, from careful experiments, that the germs of glycerin vaccination-pulp diminish in number if the glycerin be kept for some time, but do not entirely disappear; even after a period of seven months this pulp

may contain living microbes (*bacillus subtilis* and *staphylococcus albus*,—inoffensive germs). The spores of certain pathogenic microbes, as of tetanus, anthrax, and sepsis, do not seem to diminish in vitality from a prolonged sojourn in a glycerin culture. The more fragile ones, as the *staphylococcus pyogenes aureus* and the *streptococcus*, disappear in from two to four months. F. Antony, of the same place ²⁴³_{Nov., '94} obtained the same results in another series of experiments, and is therefore led to the conclusion that the use of vaccine three or four months old is practically devoid of danger, though it has not yet been determined whether the virulence of the inoculation will or will not be attenuated.

E. Climson Greenwood, in a report showing the effect of vaccination upon an epidemic of small-pox in Marylebone, England, ²_{Oct. 27, '94} draws the following conclusions: 1. That the protective influence of primary vaccination up to 5 years of age is perfect. 2. That the modifying effect of vaccination upon small-pox is greatly influenced by the number of vaccination-marks. 3. That every one should be revaccinated at the age of 10 years. 4. That vaccination in less than four places should not be allowed. 5. That in time of epidemics temporary stations should be opened and house-to-house visitations made, so that every one may be vaccinated immediately a case occurs in their house. 6. That in time of epidemics there is no occasion to close the schools if the children are examined and the unvaccinated or the imperfectly vaccinated excluded.

During the twelve months from November 1, 1894, to November 1, 1895, small-pox has appeared in the United States, as reported to the Marine-Hospital Bureau, ²⁰⁶⁷_{'95} in thirty States, covering one hundred and seventy civil districts. The number of cases reported was 3344, of which number 633 died. Some of these—namely, 178 cases, with 55 deaths—were imported into Texas from Mexico by a colony of negroes returning from Mexico in a destitute condition. They were placed in a quarantine detention camp at Eagle Pass, Texas, under the supervision of medical officers of the Marine-Hospital Service.

In several places—notably, Hot Springs, Arkansas, with 192 cases; New Orleans, Louisiana, with 124 cases; Chicago, Illinois, with 432 cases; Philadelphia, Pennsylvania, with 382 cases; Cincinnati, Ohio, with 116 cases; St. Louis, Missouri, with 218 cases; Detroit, Michigan, with 104 cases; Milwaukee, Wisconsin, with 422 cases, and Staunton, Augusta County, Virginia, with 106 cases—this disease has reached the importance of localized epidemics, requiring vigorous measures on the part of the health authorities to keep it under control. A survey of the geographical

distribution of small-pox in the United States the past year, as reported to the Marine-Hospital Bureau, shows a well-marked concentration of the disease in the central portions of this country, particularly along the great waterways.

Ten States had two-thirds of the reported cases, viz.:—

Wisconsin,	581	Louisiana,	127
Michigan,	183	Indiana,	37
Illinois,	475	Kentucky,	142
Missouri,	239	Tennessee,	66
Arkansas,	260	West Virginia,	61
Total,			2171

It is to be observed that with the exception of Wisconsin and Michigan all of these States are drained by great rivers, filled with craft engaged in interstate commerce, over which the States have no control, and this observation can be verified notably in the case of the rivers which are the tributaries of the Mississippi River, extending from Pittsburgh on the east to Hot Springs on the west and from St. Louis north to New Orleans on the south. Probably these cases were carried from point to point along these rivers by the crews of vessels engaged in the river traffic. With the exception of New Hampshire, which had 19 cases, Connecticut 3 cases, Vermont 2 cases, and Rhode Island 1 case, New England was practically free from the disease and the Atlantic coast generally was uninfected from Delaware to Florida. In all these places where the disease appeared the management of it was vested in the local health authorities; and the only occasion on which the machinery of the Marine-Hospital Service was called into play as a part of the public health organization of the country was in Texas, at Eagle Pass, before mentioned, and in connection with the vaccination of seamen on the Ohio and Mississippi Rivers. Officers of the Marine-Hospital Service at St. Louis, New Orleans, Louisville, Cairo, and Pittsburgh were furnished with vaccine virus and accorded special assistance in providing free vaccination for the seamen employed on vessels engaged in traffic on these rivers.

The medical officer in command at New Orleans began an inspection and vaccination in May, and continued it through June, making the total number of vaccinations 2576, by the aid of two sanitary inspectors. The medical officer in command at St. Louis reports the inspection of 52 vessels and the vaccination of 505 seamen, the refusal of 46 to accept vaccination, and the inspection of 1625 seamen, of whom 923 had been successfully vaccinated previously, and 151 who had suffered from variola.

The medical officer in command at Pittsburgh reports that he and his assistant boarded 72 steamers, inspected 462 boatmen, of

which number 251 were passed, 178 vaccinated, and 38 refused vaccination. "In the office of the Marine-Hospital Service there were inspected 723; of these 44 were original vaccinations, 75 passed, and the others revaccinations."

The epidemic in Staunton, Virginia, was investigated by a medical officer of the Marine-Hospital Service specially detailed, and his co-operation in the work of controlling the epidemic was tendered to the local authorities. The origin of the epidemic was traced to a negro fugitive from justice coming to Staunton from Cincinnati, Ohio, who communicated the disease to the negroes in the squalid portion of the town, whence it spread with a total of 106 cases developed.

SMALL-POX IN THE UNITED STATES FROM NOVEMBER 1, 1894, TO
NOVEMBER 1, 1895.

(As reported to the United States Marine-Hospital Bureau.)

STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.	STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.
<i>Arizona:</i>			East Chicago,	2	1
Arrivaca,	5		Des Plaines,	1	
Nogales,	51	3	Kirkland,	1	
Total,	56	3	Madison,	8	2
<i>Arkansas:</i>			Olney,	1	
Brinkley,	8		Quay,	1	
Camden,	1		Sandwich,	15	
Clay County,	50	16	Sycamore,	2	
Donaldson,	4		Villa Ridge,	5	
Garland County, including			Winetka,	4	
Hot Springs,	192	44	Total,	475	125
Holywood,	1				
Malvern,	4		<i>Indiana:</i>		
Total,	260	60	Clark County,	3	1
<i>Colorado:</i>			Covington,	1	
Pueblo,	1		Evansville,	14	
Total,	1		Franklin,	2	
<i>Connecticut:</i>			Indianapolis,	1	
Groton,	1		Jeffersonville,	1	1
New Haven,	1		La Porte,	1	
Windsor Locks,	1		Michigan City,	2	1
Total,	3		New Carlisle,	1	
<i>District of Columbia:</i>			Roby,	2	
Washington,	41	6	Tell City,	4	
Total,	41	6	Terre Haute,	1	1
<i>Florida:</i>			Walkerton,	3	
Key West,	1		Whiting,	1	
Total,	1		Total,	37	4
<i>Illinois:</i>			<i>Iowa:</i>		
Belvidere,	1		Council Bluffs,	3	
Byron,	1		Muscatine,	1	
Cairo,	1		Total,	4	
Chicago,	432	122	<i>Kentucky:</i>		
			Ashland,	10	1
			Henderson,	1	
			High Bridge,	2	
			Lexington,	75	9
			Louisville,	5	1
			Maysville,	1	
			Paducah,	31	

SMALL-POX IN THE UNITED STATES FROM NOVEMBER 1, 1894, TO
NOVEMBER 1, 1895 (*continued*).

STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.	STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.
<i>Kentucky:</i>			<i>New Hampshire:</i>		
Princeton,	11		Claremont,	11	
Union Junction,	3		Croydon,	7	
Williamstown,	2		Newport,	1	
Winchester,	1		Total,	19	
Total,	142	11			
<i>Louisiana:</i>			<i>New Jersey:</i>		
Monroe,	3	1	Harrison,	2	
New Orleans,	124	28	Hoboken,	3	
Total,	127	29	Paterson,	2	
			Snake Hill,	1	
<i>Maryland:</i>			Union Township,	1	
Charles County, near Gly-			Total,	9	
mont,	2				
Glymont,	25	3	<i>Nevada:</i>		
Total,	27	3	Carson,	15	
			Total,	15	
<i>Missouri:</i>					
Lincoln County,	20		<i>New York:</i>		
Nodaway County,	1		Brooklyn,	12	2
St. Louis,	218	54	New York,	64	21
Total,	239	54	Utica,	1	
			West Chester,	1	
<i>Minnesota:</i>			Total,	78	23
Brainard,	1				
Total,	1		<i>Ohio:</i>		
<i>Michigan:</i>			Cincinnati,	116	26
Adrian,	1	1	Cleveland,	28	1
Battle Creek,	19	4	Coal City,	2	
Bedford Township,	1		Columbus,	4	
Bengal Township,	4		Deerfield,	4	
Brownstown Township,	3	2	Gallipolis,	1	
Charlestown Township,	1	1	Lima,	1	
Chester,	1		Mansfield,	1	
Danby Township,	5		Millersport,	2	
Detroit,	104	29	Toledo,	1	
Grand Rapids,	1		Wellington,	3	
Hamtranc Township,	2		Total,	163	27
Highland Township,	1				
Marquette,	1		<i>Oklahoma:</i>		
Marshall Township,	1		Cleveland County,	7	
Olivette,	2	1	Total,	7	
Plymouth Township,	4	1			
Pontiac Township,	1		<i>Pennsylvania:</i>		
Rochester,	1		Ashbourne,	9	1
Royal Oak Township,	11	3	Danville,	1	
Sebewa,	12	1	Nazareth,	3	
Three Rivers,	1		Philadelphia,	382	54
Watersmeet,	4		Pittsburgh,	4	
Watson Township,	1		Ridley Park,	1	
Ypsilanti,	1		Wilkesbarre,	1	
Total,	183	43	Total,	401	55
<i>Mississippi:</i>					
Vicksburg,	3		<i>Rhode Island:</i>		
Total,	3		Providence,	1	
			Total,	1	

SMALL-POX IN THE UNITED STATES FROM NOVEMBER 1, 1894, TO
NOVEMBER 1, 1895 (*continued*).

STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.	STATES, CITIES, TOWNS, AND VILLAGES.	CASES.	DEATHS.
<i>Tennessee:</i>			<i>West Virginia:</i>		
Cow Island,	33		Bluefields,	1	
Ensley Plantation, Shelby County,	3		Thacker,	3	
Memphis,	30		Wheeling,	57	6
Total,	66		Total,	61	6
<i>Texas:</i>			<i>Wisconsin:</i>		
Eagle Pass,	178	51	Appleton,	10	
Fort Worth,	13	1	Beaver Dam,	1	1
Marshall,	1		Cedarburg,	5	
Taylor,	1		Chippewa Falls,	1	
Total,	193	52	Dayton,	1	
<i>Vermont:</i>			De Pere Township,	8	2
Washington,	2		Dorrance Township,	9	1
Total,	2		Dover,	4	
<i>Virginia:</i>			Eau Claire,	2	1
Buena Vista,	8		Fon du Lac,	1	
Charlottesville,	1		Fountain Township,	1	
Lexington,	9		Franklin Township,	1	
Lowmoor. (June 14, 1895. Small-pox reported.)			Gibson Township,	16	4
Newport News,	1		Granville,	1	
Nominee,	5		Lawrence Township,	9	1
Patrick Springs,	21	3	Menasha,	5	
Staunton and Augusta County,	106	6	Milwaukee,	422	102
Total,	151	9	Mishicott,	15	2
Grand total,	3347	633	Oshkosh,	3	
			Plover,	2	
			Raymond,	1	
			Rhineland,	3	1
			Rockland Township,	1	
			Rochester,	1	
			Sparta,	6	
			Springville,	1	
			Two Rivers,	7	1
			Greenfield,	41	5
			Manitowoc Rapids,	3	1
			Total,	581	122
			Grand total,	3347	633

Cholera.

Continuing the record of the progress of cholera throughout the world at the point where it was closed in the last ANNUAL (vol. v, section F., p. 27), it is to be said of this year's features that the trail of the epidemic of 1892 is still to be seen over the route of its progress during that year in Europe, although it has not since then attained such localized proportions.

In Austria-Hungary, including the provinces of Bukowina and Galicia, there were altogether to the 1st of December 15,271 cases, with 8395 deaths. In Russia, all provinces, there were 62,661 cases, with 28,589 deaths; in Turkey there were 10,565 cases, with 4692 deaths, making a total in southeastern Europe of 88,497 cases, with 41,676 deaths, representing a mortality of nearly 50 per cent. of all reported cases. This shows that the virulence

of the epidemic has not decreased to a very great extent, though lessened in its quantitative aspects.

The salient feature of this year's epidemic has been its appearance in the empire of Japan, where it attained threatening proportions after the termination of hostilities with China, and the mortality therefrom reached about 75 per cent. in a total of 50,431 cases, as up to the 3d of October there had been 34,719 deaths reported. At this date the epidemic was considered as abating, and it is to be noted that the death-rate remained unusually high for a declining epidemic, showing, as late as the third week in September, a mortality of 80.33 per cent. The epidemic was widely disseminated throughout the empire by the return of troops and coolies from the seat of war, and nearly every province contained foci of the disease. The development of commercial intercourse between this country and Japan in the last few decades, and now increased by the establishment of new steam-ship connections with our Pacific coast, afforded opportunity, not hitherto seriously considered, of the entrance of this dread disease into this country by our western frontier.

Although Japan has not generally been considered a probable source of danger to this country from cholera in consequence of the long ocean-voyage separating us, yet the history of epidemics which have occurred in that island empire discloses a continuous presence of that disease since 1877, when systematic records were first kept by the authorities. When it is understood that in that small territory there have been 481,214 cases, with 323,805 deaths, —a mortality representing about 65 per cent.,—covering a period of eighteen years to July of this year, the average number of cases being about 26,000 per annum, the better we may comprehend the danger from this point. In 1879 there were 162,637 cases, with 105,786 deaths, and in 1886 there were 155,923 cases, with 108,409 deaths,—both terrible records of the inroads this fatal disease makes when it once fastens itself upon a people ignorant of its character and unable, as they have been until very recently, to deal with it intelligently.

The present epidemic in Japan afforded the Japanese health authorities, acting through the Department of Home Affairs, a good opportunity to apply modern sanitary measures to check its progress and eradicate it from their midst.

The Sanitary Inspector of the U. S. Marine-Hospital Service on duty at Yokohama, Stuart Eldridge, reports that "the disease, by most stringent measures on the part of the Japanese authorities, has been held in check in a manner and with a success which, so far as I know, is, all things considered, unprecedented."

And again he says: "That the disease has not spread here extensively (Yokohama) is due, simply and solely, to the very active measures of precaution taken by the native authorities."

The transportation of the disease to the Hawaiian Islands was the next natural step, and it occurred in August, when the steamship *Belgie* arrived at Honolulu, the 9th of that month, having had three suspicious deaths in the steerage since her departure from Hong Kong. It was afterward learned that they had developed the characteristic symptoms of Asiatic cholera. It is probable, though not proven beyond doubt, that the *Belgie* brought the cholera to Honolulu. The disease spread among those removed to the quarantine barracks at Honolulu, was communicated to persons living contiguous, and thence to the native community, among whom it was mainly prevalent. By the vigorous action of the local health authorities in enforcing very strict sanitary measures among the ignorant islanders the disease was successfully held in check. In all, there were 87 cases belonging to the following nationalities:—

Hawaiian,	76	Portuguese,	2
Half-breeds,	4	Chinese,	1
Americans,	3	Japanese,	1

Of these 62 died, and the epidemic was ended by the 1st of October. As these islands are in frequent communication with San Francisco by a line of steamers, it was apprehended that the Pacific coast would be menaced thereby.

On this continent cholera appeared at Buenos Ayres, Argentina, and Montevideo, Uruguay, during the first quarter of 1895. In the former city there were reported 225 cases, with 134 deaths, and in the latter city 23 cases, with 4 deaths. Rosario and San Nicholas, in Argentina, also had a few cases each during the same period. In Brazil ten cities and towns were infected, or reported so, during the six months beginning December, 1894, and ending May of this year. In Rio de Janeiro 195 deaths from this disease were reported, but the number of cases has not been enumerated with sufficient clearness to establish the record of virulence of the disease or the mortality-rate. The epidemic in Brazil is now extinct, no cases having occurred since the beginning of June in Rio, and none in the valley of the Parahyba River—where it broke out—since the middle of July.

In Europe the epidemic of cholera has been gradually declining during the past twelve months, and is still confined to Austria-Hungary (where it is almost extinguished), Russia, and Turkey. "Choleraic" diseases—about a score of cases in all—have been

reported in France (at Paris and Cognac) as late as August and September, but they developed nothing of importance. In Egypt a few cases were announced at Damietta. In Russia, including the several governments and districts,—of which Podolia shows the greatest infection,—there have been 14,451 cases reported, of which 5429 died,—a mortality-rate of about 37.4 per cent.,—which shows a decrease in the virulence of the epidemic as compared with last year's mortality.

In Turkey 6802 cases have been reported during the past twelve months, of which number 3908 died.

In Asia the only point of interest relative to cholera is found in Calcutta, where it is endemic and generally constant throughout the year. There have been 1528 deaths reported in that city from the close of my report to the beginning of August. Bombay and Madras were practically free from it, but Singapore has an epidemic reported to be on the increase, with a mortality of about 20 per week,—confined, however, entirely to the natives, according to advices as late as July of this year.

Anticholeraic Inoculation.

The investigations carried out by Haffkine, relative to a system of protective inoculation against Asiatic cholera, are well known to the medical world through his experiments under the direction of his teacher, Pasteur, and his long and patient efforts to interest the government authorities of India in his work against the most dreaded of all pests. Failing in his endeavors to obtain official recognition, and especially financial aid, for the prosecution of his self-imposed task, Haffkine's own meagre means, supplemented by financial aid from the equally-slender purse of the lamented Pasteur, enabled him to proceed to India; so strong was their faith in the merit of the antitoxin to protect. It will be remembered that Haffkine put into experimental practice at Katal Bagan Bustee his system of anticholeraic inoculation. The treatment consists of the injection into the circulation of an attenuated virus and a second injection, five days later, of a similar, but stronger, virus. The former is intended to prepare the system for the second virus; and the treatment is intended to be purely preventive, and not at all remedial. The treatment does not become effective until eight days after the first and three days after the second inoculation; and it was expected to afford immunity against the disease for about a year. Such was his success at the above-mentioned place that the attention of the health authorities of Calcutta was enlisted, and the civil government appropriated 7500 rupees for the purpose of covering the actual expenses of

further experiments. During the year which followed 4397 persons were inoculated; and from the report recently submitted to the corporation of Calcutta by W. J. Simpson, the health officer of that city, the following examples of results in detail are quoted:—

In thirty-six different and widely-separated houses 521 persons were living. Of these 181 were inoculated. Cholera broke out in all. Among the 181 inoculated persons there were 4 cases, all fatal. Among the 340 uninoculated there were 45 cases, with 39 deaths. The 4 inoculated persons were stricken within five days after the first inoculation; so that the second inoculation could not be applied. Of those who received both inoculations not one took the disease. Some individual house-records are also significant. In one house 4 out of 6 were inoculated; the 4 remained well, while 1 of the other 2 died. In another house 6 out of 8 were inoculated and remained immune, while 1 of the other 2 died. In a third house 4 out of 5 were inoculated; all lived together in one room; the 4 remained well, while the 1 died of cholera. In yet another house 6 out of 7 were inoculated and had no cholera, while the seventh died of it.

In all India more than 40,000 persons have received both protective inoculations. They were all directly exposed to the contagion of cholera, but not a single case of cholera occurred among them and not a single bad effect of the treatment was observed. The Indian Medical Congress and the Calcutta Medical Society, with only a portion of these results before them, unanimously approved the continuance of the experiments; and the health officer of Calcutta, in closing his report, urges upon the Commissioners of the Corporation the sanction of a grant of 10,000 rupees for the purpose of placing the work of inoculating upon a satisfactory financial basis.

If the government of India were to rise to its public duty in this matter,—for India is quite rightly regarded as the home of cholera,—it would be leading the way to the introduction of a prophylactic measure which, either in its present or in a modified form, may be expected to effect an enormous reduction in the ravages of this disease not only among its own people, but among western populations who suffer periodically from its spread beyond the Indian frontiers.

It furnishes a regret to the medical profession to learn that Haffkine, almost triumphant over the worst of plagues, is so broken in health, from overwork in India, that he has been obliged to return to France and leave to his assistants in India the work which he so nobly undertook.

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895.

(As reported to the United States Marine-Hospital Bureau.)

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Arabia:</i>				
Camaran Quarantine Station.	Mar. 23 to Apr. 24 . .	85	173	
Mecca	June 19 to June 21 . .	17	16	
	Apr. 22 to May 6		213	
Jeddah	June 9 to June 14		17	
Taif	May 1		28	
	June 19 to June 21		24	
<i>Argentina:</i>				
Buenos Ayres	To Jan. 10	125	59	
	Jan. 1 to Jan. 31	87	27	
	Feb. 1 to Feb. 28		45	
	Mar. 13	8	3	
	Mar. 21	5	3	
Rosario	Mar. 21	8	3	
San Nicholas	Mar. 29	7	3	
<i>Asia Minor:</i>				
Tarsus	June 1			Cholera reported.
<i>Austria-Hungary:</i>				
Galicia	Nov. 5 to Feb. 17	1479	773	
Belgium	Nov. 18	243		
<i>Brazil:</i>				
	Dec. 11 to Feb. 4			Cholera reported.*
Alegre	Apr. 3	1		
Bahia	Apr. 3			Cholera reported.
Cachoeira	Feb. 24 to Mar. 3	40	21	
Desergano	Mar. 20	11		
Itapemeriun	Mar. 20	50	2	
Porto Novo	Apr. 3			Cholera reported.
Rio de Janeiro	Dec. 1 to Dec. 31	6	5	
	Jan. 1 to Jan. 31		45	
	Feb. 1 to Feb. 28		105	
	Mar. 1 to Mar. 28	93	31	
	Mar. 29 to Apr. 20		8	
	May 11 to May 18		1	
Santo Antonio de Muriatre	Apr. 3	18	15	
Volta Redondo	Apr. 3	1		
<i>Ceylon:</i>				
Colombo	Jan. 26 to Feb. 2	8	8	
<i>China:</i>				
Che-foo	Aug. 14			Cholera reported.
Foo-chow	Apr. 30			Cholera reported.
Hong Kong	June 15 to June 22		2	
	July 27 to Aug. 3		7	
	Aug. 10 to Aug. 24			
Tien-tsin	Aug. 14			Cholera reported.
<i>Egypt: †</i>				
Damietta	Oct. 15	15	3	
<i>France:</i>				
Cognac	Aug. 17 to Aug. 24		1	
	Aug. 31 to Sept. 6	1	1	
	Sept. 29 to Oct. 5		1	
Paris	Aug. 11 to Sept. 7	7		"Choleraic affections."
	Sept. 15 to Sept. 21	6		"Choleraic affections."
	Sept. 29 to Oct. 5	3		
	Oct. 13 to Oct. 19	1		"Choleraic affections."
Roubaix	Sept. 1 to Sept. 30		33	
<i>Germany</i>	Nov. 1 to Dec. 31	26	13	
<i>Hawaiian Islands:</i>				
Honolulu	Aug. 18 to Oct. 3	88	63	"Choleraic affections."
<i>Holland</i>	Dec. 8		7	
<i>India:</i>				
Bombay	Nov. 1 to Jan. 8		6	
	Mar. 5 to Mar. 12		1	
	Apr. 23 to May 21		7	
	May 28 to June 18		2	
	June 26 to July 9		2	
	July 27 to Aug. 2		1	
	Aug. 6 to Aug. 20		6	"Choleraic affections."
	Aug. 27 to Sept. 10		4	
	Sept. 17 to Oct. 29		10	

* Towns, Cachoeira, Cruzeiro; Campo Bello, Barra; Reyende Quelens, and Volta Redondo.

† The exact number of cholera deaths and cases throughout Egypt during the outbreak now existing (November 1) is not known. From October 11 to November 1 there have been, approximately, between 300 and 400 cases and about 200 deaths.

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894, TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.	
Calcutta	Nov. 3 to Feb. 13	469	303		
	Mar. 2 to Mar. 20	945	69		
	Mar. 31 to Oct. 19	2	1		
Madras	Nov. 1 to Feb. 22	2	3		
	Mar. 2 to Mar. 8	1	1		
	Mar. 16 to Mar. 30	1	1		
	May 11 to May 17	1	1		
	June 22 to July 5	1	1		
	July 20 to July 26	8	6		
	Aug. 3 to Aug. 23	6	6		
	Aug. 31 to Sept. 6	6	6		
	Sept. 20 to Oct. 4	27	13		
Singapore	June 21 to June 26	80	75		
	June 1 to June 30	17	8		
	July 9 to July 29	22	13		
	Aug. 12 to Aug. 19	22	13		
	Aug. 19 to Sept. 2	2	2		
	Sept. 13 to Sept. 17				
Japan:				From outbreak to Sept. 12:	
Akita Ken	Sept. 13 to Sept. 19	2	9	Cases.	Deaths.
	Sept. 20 to Oct. 10	9	50		
	Oct. 11 to Oct. 24	83	309		
Tokyo Fu	Sept. 6 to Sept. 19	412	346	2008	1301
	Sept. 20 to Oct. 10	492	390		
	Oct. 11 to Oct. 24	533	171		
Kioto Fu	Sept. 6 to Sept. 19	184	74	1689	1309
	Sept. 20 to Oct. 10	65	34		
	Oct. 11 to Oct. 24	34	14		
Osaka Fu	Sept. 6 to Sept. 19	483	550	6505	4618
	Sept. 20 to Oct. 10	389	369		
	Oct. 11 to Oct. 24	69	75		
Kanagawa Ken	Sept. 6 to Sept. 19	79	77	782	475
	Sept. 20 to Oct. 10	41	29		
	Oct. 11 to Oct. 24	33	33		
Hiogo Ken	Sept. 6 to Sept. 19	308	248	3430	2523
	Sept. 20 to Oct. 10	156	191		
	Oct. 11 to Oct. 24	34	29		
Nagasaki Ken	Sept. 6 to Sept. 19	144	115	1610	1103
	Sept. 20 to Oct. 10	55	42		
	Oct. 11 to Oct. 24	12	10		
Niligata Ken	Sept. 6 to Sept. 19	25	14	89	52
	Sept. 20 to Oct. 10	19	10		
	Oct. 11 to Oct. 24	35	23		
Saitama Ken	Sept. 6 to Sept. 19	52	36	212	146
	Sept. 20 to Oct. 10	27	26		
	Oct. 11 to Oct. 24	12	9		
Chiba Ken	Sept. 6 to Sept. 19	86	60	615	427
	Sept. 20 to Oct. 10	62	48		
	Oct. 11 to Oct. 24	29	25		
Ibaraki Ken	Sept. 6 to Sept. 19	200	158	866	565
	Sept. 20 to Oct. 10	65	48		
	Oct. 11 to Oct. 24	11	12		
Gumba Ken	Sept. 6 to Sept. 19	3	1	23	9
	Sept. 20 to Oct. 10	9	7		
	Oct. 11 to Oct. 24	5	2		
Tochigi Ken	Sept. 6 to Sept. 19	66	38	245	154
	Sept. 20 to Oct. 10	43	38		
	Oct. 11 to Oct. 24	7	5		
Nara Ken	Sept. 6 to Sept. 19	104	86	654	467
	Sept. 20 to Oct. 10	53	48		
	Oct. 11 to Oct. 24	8	8		
Miya Ken	Sept. 6 to Sept. 19	109	14	88	17
	Sept. 20 to Oct. 10	121	81		
	Oct. 11 to Oct. 24	52	67		
Aichi Ken	Sept. 6 to Sept. 19	145	115	288	191
	Sept. 20 to Oct. 10	106	76		
	Oct. 11 to Oct. 24	88	55		
Shidzuoka Ken	Sept. 6 to Sept. 19	114	64	337	203
	Sept. 20 to Oct. 10	30	24		
	Oct. 11 to Oct. 24	21	18		
Yamanashi Ken	Sept. 6 to Sept. 19	39	12	50	26
	Sept. 20 to Oct. 10	38	22		
	Oct. 11 to Oct. 24	8	6		
Shiga Ken	Sept. 6 to Sept. 19	15	17	246	190
	Sept. 20 to Oct. 10	11	8		
	Oct. 11 to Oct. 24	5	4		

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.	
				From outbreak to Sept. 12: Cases.	Deaths.
<i>Japan:</i>					
Gifu Ken.	Sept. 6 to Sept. 19	33	13	69	38
	Sept. 20 to Oct. 10	28	13		
	Oct. 11 to Oct. 24	21	13		
Nagano Ken	Sept. 6 to Sept. 19	22	4	17	10
	Sept. 20 to Oct. 10	5	18		
	Oct. 11 to Oct. 24	2	4		
Miyagi Ken	Sept. 6 to Sept. 19	904	597	1470	869
	Sept. 20 to Oct. 10	295	203		
	Oct. 11 to Oct. 24	74	55		
Fukushima Ken	Sept. 6 to Sept. 19	152	101	335	187
	Sept. 20 to Oct. 10	133	89		
	Oct. 11 to Oct. 24	34	21		
Iwate Ken	Sept. 6 to Sept. 19	26	14	5	3
	Sept. 20 to Oct. 10	65	22		
	Oct. 11 to Oct. 24	18	3		
Awomori Ken	Sept. 6 to Sept. 19	2	1	13	7
	Sept. 20 to Oct. 10	378	211		
Yamagata Ken	Sept. 6 to Sept. 19	307	213	525	280
	Sept. 20 to Oct. 10	59	64		
Fukui Ken	Sept. 6 to Sept. 19	121	76	182	127
	Sept. 20 to Oct. 10	114	96		
	Oct. 11 to Oct. 24	65	60		
Ishikawa Ken	Sept. 6 to Sept. 19	63	34	72	37
	Sept. 20 to Oct. 10	214	127		
	Oct. 11 to Oct. 24	215	173		
Toyama Ken	Sept. 6 to Sept. 19	912	647	607	384
	Sept. 20 to Oct. 10	1547	1118		
	Oct. 11 to Oct. 24	435	349		
Tottori Ken	Sept. 6 to Sept. 19	214	131	1014	659
	Sept. 20 to Oct. 10	67	64		
	Oct. 11 to Oct. 24	30	12		
Shimane Ken	Sept. 6 to Sept. 19	150	110	634	406
	Sept. 20 to Oct. 10	139	94		
	Oct. 11 to Oct. 24	26	27		
Okayama Ken	Sept. 6 to Sept. 19	319	333	2699	1812
	Sept. 20 to Oct. 10	96	72		
	Oct. 11 to Oct. 24	25	18		
Hiroshima Ken	Sept. 6 to Sept. 19	355	280	3624	2664
	Sept. 20 to Oct. 10	205	194		
	Oct. 11 to Oct. 24	47	35		
Yamaguchi Ken	Sept. 6 to Sept. 19	145	100	1993	1385
	Sept. 20 to Oct. 10	58	43		
	Oct. 11 to Oct. 24	9	8		
Wakayama Ken	Sept. 6 to Sept. 19	56	47	461	345
	Sept. 20 to Oct. 10	96	69		
	Oct. 11 to Oct. 24	24	19		
Tokushima Ken	Sept. 6 to Sept. 19	47	41	378	196
	Sept. 20 to Oct. 10	17	13		
	Oct. 11 to Oct. 24	14	9		
Kagawa Ken	Sept. 6 to Sept. 19	429	318	2029	1178
	Sept. 20 to Oct. 10	135	108		
	Oct. 11 to Oct. 24	19	21		
Yehime Ken	Sept. 6 to Sept. 19	241	153	1226	816
	Sept. 20 to Oct. 10	107	85		
	Oct. 11 to Oct. 24	25	19		
Kochi Ken	Sept. 6 to Sept. 19	176	141	730	501
	Sept. 20 to Oct. 10	106	79		
	Oct. 11 to Oct. 24	29	31		
Fukuoka Ken	Sept. 6 to Sept. 19	192	180	1877	1143
	Sept. 20 to Oct. 10	88	69		
	Oct. 11 to Oct. 24	38	23		
Oita Ken	Sept. 6 to Sept. 19	93	62	755	450
	Sept. 20 to Oct. 10	55	45		
	Oct. 11 to Oct. 24	11	5		
Saga Ken	Sept. 6 to Sept. 19	54	43	250	169
	Sept. 20 to Oct. 10	27	16		
Kumamoto Ken	Sept. 6 to Sept. 19	127	90	501	280
	Sept. 20 to Oct. 10	108	75		
	Oct. 11 to Oct. 24	47	23		
Miyasaki Ken	Sept. 6 to Sept. 19	143	72	171	101
	Sept. 20 to Oct. 10	101	43		
	Oct. 11 to Oct. 24	16	13		

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.
				From outbreak to Sept. 12: Cases. Deaths.
Kagoshima Ken	Sept. 6 to Sept. 19 . .	82	44	277 155
	Sept. 20 to Oct. 10 . .	189	129	
	Oct. 11 to Oct. 24 . .	37	29	
Niiijima Quarantine	Sept. 6 to Sept. 19 . .	7	3	538 274
	Sept. 20 to Oct. 24 . .	7	7	
Okinawa Ken	Sept. 6 to Sept. 19 . .	3	1	14 5
	Sept. 20 to Oct. 3 . .	24	18	
	Oct. 11 to Oct. 24 . .	17	9	
Hokkaido Ken	Sept. 6 to Sept. 19 . .	3	2	13 2
	Sept. 20 to Oct. 10 . .	34	6	
	Oct. 11 to Oct. 24 . .	6	2	
Hikojima Quarantine	Sept. 6 to Sept. 19 . .	3	1	301 194
	Sept. 20 to Oct. 3 . .	4	1	
	Oct. 11 to Oct. 24 . .	1	1	
Sakurajima Quarantine . . .	Sept. 6 to Sept. 19 . .	1	1	197 60
North Formosa	July 2 to Aug. 10 . .	150	56	
	Oct. 3 to Oct. 10 . .	1279		
<i>Korea:</i>				
Chemulpo	July 13			Cholera reported.
Weijii	June 30			Cholera reported.
<i>Morocco:</i>				
Tangier	Sept. 1 to Sept. 30 . .	800	600	
	Oct. 1 to Oct. 31 . .	1000	800	
	Sept. 28 to Oct. 7 . .	1680	394	
<i>Russia (governments):</i>				
Archangel	Nov. 1 to Nov. 3 . .	4	3	
Baku	Nov. 4 to Dec. 8 . .	9	8	
Bessarabia	Nov. 11 to Jan. 12 . .	135	62	Cholera reported.
Dubno	Aug. 11 to Aug. 17 . .	35	26	
Ekatynoslav	Nov. 11 to Dec. 15 . .	61	35	
Grodno	Nov. 25 to Dec. 8 . .	28	10	
Kiev	Sept. 8 to Sept. 21 . .	14	18	
	Sept. 22 to Sept. 26 . .	59	37	
	Sept. 28 to Oct. 12 . .	161	71	
Kovno	Nov. 11 to Dec. 29 . .	98	53	
	Jan. 20 to Jan. 21 . .	1	1	
Kremenez	Aug. 11 to Aug. 17 . .	5	3	Cholera reported.
Kurland	Nov. 4 to Dec. 15 . .	44	21	
	Dec. 23 to Feb. 2 . .	9	6	
Kursk	Dec. 2 to Jan. 19 . .	11	8	
Lomza	Nov. 18 to Dec. 2 . .	45	14	
Lublin	Nov. 3 to Dec. 8 . .	54	20	
Minsk	Nov. 16 to Jan. 12 . .	52	16	
Mohilev	Nov. 25 to Dec. 22 . .	7	4	Cholera reported.
Nowogrodwalynski	Aug. 11 to Aug. 17 . .	20	12	
Olonez	Nov. 18 to Nov. 24 . .	39	22	Cholera reported.
Ostrog	Aug. 11 to Aug. 17 . .	74	37	
Pensa	Nov. 11 to Nov. 24 . .	6	1	
Perm	Nov. 4 to Dec. 8 . .	2102	907	
Petrikov	Nov. 25 to Dec. 22 . .	101	45	
	Jan. 4 to Jan. 19 . .	51	19	
Podolia	Nov. 11 to Apr. 13 . .	28	17	
	Aug. 21 to Aug. 31 . .			
Podolsk	Sept. 1 to Sept. 14 . .			
Primorskjabezirk (Si-beria)	Mar. 24 to Apr. 27 . .			
	July 30 to Sept. 17 . .	82	58	
Pskov	Nov. 16 to Dec. 7 . .	4	2	
Radom	Jan. 1 to Jan. 26 . .	20	9	
Riasan	Nov. 4 to Jan. 5 . .	52	33	
Saratov	Nov. 11 to Jan. 12 . .	29	20	
Saslaw	Aug. 11 to Aug. 17 . .			Cholera reported.
Starokonstantinow	Aug. 11 to Aug. 17 . .			Cholera reported.
Suwalki	Jan. 18 to Jan. 26 . .	25	10	
Tamboy	Nov. 18 to Dec. 8 . .	42	16	
Taurien	Nov. 4 to Jan. 26 . .	96	58	
Tchernigov	Nov. 4 to Feb. 16 . .	85	28	
Tiflis	Nov. 4 to Dec. 1 . .	35	11	
Volhynia	Nov. 4 to Apr. 30 . .	586	230	Cholera reported.
	May 26 to July 6 . .	229	65	
	July 6 to July 20 . .	214	85	
	July 21 to Aug. 3 . .	688	238	
	Aug. 4 to Aug. 10 . .	1004	322	

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Russia</i> (governments):				
Volhynia	Aug. 11 to Aug. 17 . .	2025	718	
	Aug. 18 to Aug. 24 . .	2497	944	
	Sept. 1 to Sept. 14 . .	7791	3085	
	Sept. 15 to Sept. 28 . .	4269	1701	
	Sept. 29 to Oct. 12 . .	2901	1190	
Warsaw	Aug. 26	1		
Wilna	Nov. 11 to Dec. 11 . .	44	18	
Witebst	Nov. 18 to Dec. 29 . .	55	32	
	Jan. 6 to Jan. 12 . . .	5	2	
	Nov. 11 to Dec. 22 . .	28	6	
Yaroslav				
Districts of Ostrog, Kre-				
wenez, Saslaw, Staro-				
konstantinow, Nowo-	Sept. 15 to Sept. 21 . .	1389	550	
grodwalynski, Dubno,	Sept. 25 to Sept. 31 . .	3352	1190	
Rowno, Luzk, Schito-				
mir, and Komel				
Districts of Proskurow and				
Letitschew	Sept. 1 to Sept. 14 . .	51	19	
<i>Turkey:</i>				
Adalia	Dec. 11 to Feb. 18 . .	230	127	
	Oct. 2 to Oct. 3 . . .	2	1	
Adana	May 25 to June 1 . . .	50	30	
	July 14 to July 28 . .	27	16	
Adana (vilayet)	July 23 to Aug. 10 . .	105	49	
	Aug. 12 to Aug. 27 . .	35	19	
Aleppo	Aug. 5			Cholera reported.
	June 1 to June 15 . . .	550	300	
	June 15 to July 24 . .	684	326	
	July 22 to Aug. 21 . .	371	158	
	Aug. 21 to Sept. 4 . .	8	3	
	Sept. 1 to Sept. 13 . .	15	8	
	Sept. 25 to Sept. 28 . .	10	6	
Aleppo (vilayet)	July 24 to Aug. 12 . .	98	57	
	Aug. 6 to Aug. 20 . .	191	98	
Alan-Sinar	June 30	12		
Angora (vilayet)	July 11 to July 23 . .	32	17	
Bitlis	Jan. 3			Cholera reported.
Broussa	Aug. 26 to Sept. 1 . .	84	57	
Broussa (vilayet)	Aug. 24 to Aug. 30 . .	32	16	
Bulanik	June 21 to June 22 . .	5	5	
	July 1 to July 21 . . .	51	35	
Constantinople	Nov. 1 to May 6 . . .	391	216	
	June 20 to Aug. 8 . . .	1	1	
	Sept. 8 to Sept. 26 . .	24	14	
	Oct. 7	1		
Diabekar	Aug. 5 to Aug. 12 . .	83	66	
	Aug. 12 to Sept. 1 . .	261	300	
	Sept. 1 to Sept. 29 . .	47	35	
Djabul	June 26 to July 1 . . .	15	7	
Gok-Sun	July 8		8	
Hadji-Bil	July 7	3	3	
Hadji	July 17	1	1	
Hamah	July 22 to Aug. 3 . . .	20	5	
Hatschin	June 10 to June 18 . .	9	6	
	July 1 to July 25 . . .	22	10	
Homs	Aug. 7 to Aug. 10 . . .		1	
Hudavendkjar (vilayet) .	July 14 to Aug. 12 . .	67	86	
	Aug. 18 to Aug. 25 . .	182	56	
	Sept. 1 to Sept. 14 . .	199	35	
	Sept. 14 to Sept. 29 . .	15	7	
	Oct. 7	1		
Husu Mansur	July 8 to Aug. 10 . . .	303	138	
Jumurtalik	June 18 to June 20 . .	1	1	
	July 10 to July 27 . . .	33	19	
Karahisse	July 7 to July 11 . . .	11	7	
Kara-Isdab	June 17 to June 24 . .	17	4	
Karataseh	June 17 to June 29 . .	89	44	
	June 30	23	27	
	July 13 to July 24 . . .	11	11	
Karszulcadria	July 9	10	2	
Konia (vilayet)	July 21 to Aug. 12 . .	32	16	
Marash	June 10 to June 30 . .	27	17	
	June 30 to July 20 . .	33	18	
Mersina	May 25 to June 1 . . .	3	1	
	June 1 to June 15 . . .	2	2	

TABLE SHOWING THE PREVALENCE OF CHOLERA FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Turkey:</i>				
Mersina	June 15 to July 16 . .	410	235	Cholera reported.
	June 28 to June 29 . .	3	2	
	July 14 to July 27 . .	21	15	
Mesis	Aug. 5			Cholera reported.
	June 17 to June 29 . .	27	8	
	June 29 to July 11 . .	17	8	
Mossoul	Sept. 20 to Sept. 24 . .	1	2	
Padzardjik	July 8	7	7	
Pajast	June 16 to June 29 . .	17	6	
	July 1 to July 9	26	24	Cholera reported.
Pera	July 13 to July 25 . .	46	12	
Rania (vilayet)	Feb. 21			
Sis	July 21 to Aug. 12 . .	32	16	
	June 10 to June 29 . .	87	58	
	July 1 to July 27	33	17	
Siverek	Jan. 8 to Jan. 21	48	31	
Tarsus	May 18 to June 1	470	315	
	June 1 to June 15	750	530	
	June 15 to July 16	293	143	Cholera reported.
Yah Yali (vilayet)	Aug. 5			
	July 21 to July 27	20	9	
<i>Uruguay:</i>				
Montevideo	Mar. 13		3	
	Mar. 16	16		
	Mar. 18	5		
	Mar. 21	2	1	

Yellow Fever.

In the island of Cuba and in Brazil it will be found that the disease assumed epidemic form as usual in 1895, and while it is not entirely possible, from the character of the reports made, to give satisfactory judgment as to the severity of the disease in the two countries, as the reports have not been of the desired uniformity,—some giving only the deaths from yellow fever, others giving both cases and deaths,—yet an intelligent survey of the situation may be gathered from an examination of the table.

In Brazil there have been 619 cases, with 492 deaths, in Rio and Santos, but in the former city the number of cases has not been reported, as is the case with Santos, which report includes both cases and deaths.

In Cuba the existing insurrection has interfered to a great extent with the transmission of exact information from the disturbed provinces excepting the coast cities, and the normal condition of health in that island has been, of course, largely modified by the presence of a large body of non-immune Spanish soldiers, sent by the home government to quell the rebellion. These persons have taken the disease and added to the natural number of cases annually prevalent in the island.

From the reports transmitted a total of 1449 deaths have been reported in sixteen civil districts. These reports include,

however, only a minute proportion of the cases which have occurred among the troops, no exact statement being furnished. Havana is credited with 544 deaths and Santiago de Cuba with 527 deaths; and the reports from Havana give a total of 1527 cases, from which a mortality of about 30 per cent. is deducted.

On the island of Puerto Rico the disease has been quite prevalent, many cases appearing in the military hospitals.

In San Juan, Puerto Rico, 159 cases with 115 deaths make the record for the past twelve months.

In Mexico a few isolated cases have appeared in several of the coast towns, but only in Vera Cruz, where in the last year 135 deaths have been reported, has it reached epidemic importance.

The history of yellow fever on the Western Hemisphere is made complete by stating that it has not been reported outside of these places above mentioned except a few isolated cases in Ecuador, Salvador, Venezuela, and two of the West India islands.

Following is a table prepared in the Division of Sanitary Reports and Statistics of the Marine-Hospital Bureau showing the prevalence of yellow fever in all countries:—

TABLE SHOWING THE PREVALENCE OF YELLOW FEVER FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895.

(As reported to the United States Marine-Hospital Bureau.)

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Brazil:*</i>				
Pernambuco	Aug. 23	30	3	Yellow fever reported.
	Sept. 28 to Oct. 12		164	
Rio de Janeiro	Dec. 1 to Mar. 30		301	
	Apr. 1 to June 22		90	
	June 30 to Aug. 31		25	
Santos	Sept. 1 to Oct. 12		6	
	Nov. 23 to Jan. 5	123	104	
	Jan. 26 to Mar. 2	50	48	
	Mar. 9 to Mar. 16	108	87	
	Mar. 23 to Mar. 30	181	135	
	Apr. 17 to Apr. 27	105	96	
	Apr. 27 to May 3	33	18	
	May 24 to May 31	17	4	
	June 23 to July 6	2		
	Aug. 3 to Aug. 10			
<i>Cuba:</i>				
Baracoa	July 1 to July 31		12	
	Aug. 1 to Aug. 31		22	
Cienfuegos	June 23 to June 30		1	
	July 7 to July 21	3	3	
	Aug. 4 to Aug. 11	1		
	Sept. 1 to Sept. 15	4	3	
	Sept. 22 to Oct. 27		11	
Cardenas	Oct. 4	4		

* The United States Consul states, under date of October 25th, that there is more yellow fever than has been known during the past twenty years.

TABLE SHOWING THE PREVALENCE OF YELLOW FEVER FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Cuba:</i>				
Firmeza	Sept. 13	1	1	Yellow fever reported.
Gibara	Jan. 1 to June 23	62	12	
Guatanamo	July 1 to Aug. 31	60	60	
Habana	Nov. 1 to Dec. 20	96	36	
	Dec. 20 to Apr. 4	85	30	
	Apr. 4 to May 30	37	16	
	June 1 to June 29	31	14	
	June 30 to July 25	164	59	
	July 26 to Aug. 8	155	54	
	Aug. 8 to Aug. 22	145	51	
	Aug. 22 to Aug. 29	90	30	
	Aug. 29 to Sept. 5	80	26	
	Sept. 5 to Sept. 19	210	67	
	Sept. 19 to Oct. 3	160	51	
	Oct. 3 to Oct. 10	120	33	
	Oct. 10 to Oct. 24	160	43	
	Oct. 24 to Oct. 31	60	16	
Manzanillo	July 1 to July 31	43	43	
	Aug. 1 to Aug. 31	23	23	
	Sept. 1 to Sept. 30	18	18	
	Oct. 1 to Oct. 15	21	21	
Matanzas	Nov. 1 to Nov. 7	5	2	
	July 21 to Aug. 23	16	16	
	Aug. 24 to Aug. 28	12	12	
	Sept. 1 to Oct. 2	38	3	
Puerto Principe	June 27	1	1	About 5 deaths daily.
Sagua la Grande	July 13 to July 27	1	1	
	Aug. 3 to Aug. 10	4	4	
	Aug. 21	1	1	
	Sept. 7 to Sept. 21	5	5	
	Sept. 28 to Oct. 12	30	30	
	Oct. 12 to Nov. 2	13	13	
Sancti Spiritu	Aug. 24	30	30	
Santa Clara	Aug. 25	2	2	
Santiago de Cuba	Nov. 1 to Nov. 10	11	5	
	Mar. 1 to Mar. 31	8	8	
	Apr. 1 to Apr. 28	11	11	
	May 1 to May 15	4	4	
	June 1 to June 29	47	47	
	June 30 to Aug. 17	259	259	
	Aug. 17 to Aug. 31	44	44	
	Sept. 1 to Sept. 14	27	27	
	Sept. 15 to Sept. 28	38	38	
	Sept. 28 to Oct. 12	19	19	
	Oct. 13 to Nov. 9	79	79	
Santo Domingo	Aug. 25	2	2	
Yaribacoa	Sept. 1 to Sept. 30	7	7	
<i>Ecuador:</i>				
Guayaquil	Oct. 4 to Nov. 8	3	3	
	Jan. 24 to Feb. 22	14	8	
<i>Mexico:</i>				
Acapulco	Sept. 14 to Sept. 21	1	1	
Guaymas	May 20	1	1	Yellow fever reported.
La Paz	Sept. 24	3	3	
Mazatlan	Sept. 24	1	1	Yellow fever reported.
Vera Cruz	Nov. 1 to Nov. 22	3	3	
	Dec. 27 to Jan. 24	5	5	Yellow fever reported.
	Feb. 21 to Feb. 28	1	1	
	Mar. 4 to Mar. 21	2	2	
	Apr. 4 to Apr. 18	11	11	
	May 2 to May 30	35	35	
	May 31 to July 11	78	78	
	July 18 to Oct. 3	1	1	
	Oct. 17 to Oct. 24	1	1	
Puerto Rico	Nov. 1 to Jan. 9	2	2	
	Feb. 28 to Mar. 6	1	1	
	Apr. 17 to Apr. 24	1	1	
Mayaguez	Oct. 2	1	1	A few cases have occurred among the garrison.
Aguadilla	Oct. 1	1	1	
San Juan	July 1	104	87	Over 100 cases in military hospital.
	July 6 to July 27	22	16	
	Aug. 3 to Aug. 31	22	6	
	Sept. 1 to Sept. 21	21	7	
	Sept. 21 to Oct. 12	21	7	

TABLE SHOWING THE PREVALENCE OF YELLOW FEVER FROM NOVEMBER 1, 1894,
TO NOVEMBER 1, 1895 (*continued*).

Places.	Date.	Cases.	Deaths.	Remarks.
<i>Salvador</i>	Nov. 1 to Jan. 15	57		
	Nov. 1			Yellow fever reported.
<i>Venezuela:</i>				
Betizogue	Nov. 6			Yellow fever reported.
Maracaibo	Nov. 17 to Nov. 24	1	1	
	Feb. 2 to Feb. 9	1	1	
	June 8 to June 15	1	1	
<i>West Indies:</i>				
Antigua (St. Johns)	Sept. 23 to Oct. 26	3	3	
Curaçoa	Dec. 28 to Jan. 5	3	3	

ANATOMY.

By L. TESTUT, M.D.,

ASSOCIATE EDITOR,

LYONS.

Osteology.

Garnault ⁹²⁷_{No. 6, '95} has undertaken to verify Körner's views on a question which is of much practical importance in otological experiments. Körner had declared that the floor of the middle cerebral fossa is higher in long skulls than in short skulls, and also that the continuation forward of the lateral sinus before its descent is in direct relation to the degree of brachicephaly. Garnault's studies were made on sixty skulls, of which only seven were mesaticephalic. It is needless to go into details when the conclusions are so sweeping as they are in this case, for Garnault finds, to state it most favorably for Körner, that his conclusions are of no practical value.

R. Clement Lucas ²⁷⁷_{v. 29, Jan., '96} describes a small groove which is found very constantly on the inner surface of the spine of the sphenoid bone, caused by the chorda tympani nerve. It is important as locating definitely the course of this interesting structure after its escape from the skull. It is situated behind and usually rather internal to the foramen spinosum. The best guide to the groove on the entire skull is the tubercle at the front of the vaginal process of the temporal bone. In some cases the groove broadens anteriorly. Lucas suggests very plausibly that this may be due to movements transmitted to the nerve through the lingual, which, of course, moves with the tongue.

Wilmart ⁸⁶⁸_{Sept. 29, '94} discusses the external conformation of long bones and of flat bones. He comes to the conclusion, from an examination of flat bones, that their surface is formed either to be as extensive as possible for a determined diameter or to occupy as much volume as possible for a determined surface. He comes to the following conclusions respecting long bones: 1. Polyhedrous forms, such as the triangular prisms and pyramids, predominate among the long bones. 2. These forms afford the greatest possible amount of surface for muscular insertions. Comparing these two conclusions to those to which he had come respecting flat bones,

he formulates the general law that both in flat and in long bones the surface is a maximum, the function and the volume being taken into account.

S. Floyd, of Long Reach, Dartford, ⁶_{Sept. 29, '04} describes a curious deformity of the chest-wall. The second, third, and fourth ribs and costal cartilages on the right side of the chest were found to be deficient; so that the space wanting in the chest-wall measured three and one-half inches vertically and two and one-half inches horizontally. At the fourth space the right side of the thorax measured twelve and one-half inches in circumference and the left fourteen inches. The unprotected space was markedly depressed on deep inspiration, but the ordinary physical signs elicited upon examination of the thorax were normal, though a little pronounced. The pectoralis major and minor were absent on the right side, with the exception of the clavicular head of the former, which was more developed than on the opposite side. The rest of the pectoralis major was represented by a fibrous band. The right deltoid muscle was hypertrophied, but the boy had almost as much power with the right as with the left arm. In every other respect the chest was quite normal. The costal ends of the third and fourth cartilages could be felt to be joined together, but the other deficient ribs and cartilages terminated separately. The deformity is congenital, and no other member of the family is affected in any way.

Morestin ⁷_{Nov. 19, '04} describes an acromial bone which he observed in a woman of 40 years. The anomaly was unilateral and situated on the right scapula. It consisted in a separate bone, triangular in shape, the base of which was directed backward and inward. It was united to the scapular spine by amphiarthrosis. In addition, the external extremity of the clavicle was articulated with the internal border of the anomalous bone in exactly the same manner as it is articulated usually with the normal acromion.

John Struthers, of Edinburgh, ³⁶_{Oct., '04}; ¹_{Oct. 12} reported a case in which a separate acromion process simulated a fracture,—a condition which the author has frequently met with in dissecting-rooms. He states that true fracture of the acromion occurring at various places and in various directions is not infrequent, but it is overlooked from the absence of displacement. The condition in question, says the author, may possibly still come within the definition of fracture in the sense that it may, in some cases, have begun as a fracture of the layer of cartilage between the basi-acromion and the ossified epiphysis; and, in that event, the movements of the acromion against the clavicle may be sufficient to prevent union and to establish a joint between the two parts of the acromion.

This, however, he says, is not likely to be the history in cases in which the separation exists on each side.

Jonathan Hutchinson, of London, ²²_{July 3, '95} reported a case of symmetrical absence of the radii. The family history was of considerable interest. The mother had been twice married. By the first husband she had had three children, of whom one only was alive, and it was quite healthy. The other two had died in infancy from convulsions and each had been born deformed. By the second husband she had had four children, all of whom were deformed. The position of the hands observable in this child as a result of the defect was typical. The hands were pushed over in these cases by the styloid process of the ulna. Often the forefinger and thumb were absent with the radius, but both were present in this case. The hands showed, indeed, no defect. The ulna was very rarely deficient. Hutchinson, however, stated that he had seen many cases in which the radius was absent. It was of interest to note that sometimes this bone was not entirely deficient, but only a part of it. The deformity in question was a well-recognized condition, and it formed a good example of the law of the inheritance of family diseases.

Thilenius ¹²⁶_{Apr. 15, '95} describes an abnormal bone which he denominates "*os intermedium antibrachii*." He examined, with regard to it, one hundred and twenty-six hands of human embryos of from the second to the fourth month. At the second month he found, in 65 per cent. of the cases, a cartilaginous nucleus, distinctly limited and independent, situated between the radius, the cubitus, and the first row of the carpus. This nucleus is formed to the distal side of what will, later on, constitute the meniscus, but remains on the proximal side of the radio-carpal articular cleft, when the latter appears. At the third month the nucleus is noted in but 50 per cent. of the cases. Its frequency is even less at the fourth month (30 per cent.). In the adult it has been met with but once (Pfitzner) as a bony nucleus. This is due to the fact that the cartilaginous nucleus retrocedes and vanishes without leaving any trace of its presence, or that it becomes joined to the styloid process of the cubitus. In addition it undergoes other changes during its evolution; it may become inserted into the articular meniscus, or, what is almost always the rule, may leave the neighborhood of the styloid process of the cubitus in order to draw nearer to the radius. This bone deserves in every way the denomination of "*intermediary bone of the forearm*." It is found, though not always constantly, among certain anthropoids (Camper's bone) and marsupialia. Its evolution in the human embryo allows it to be classed with sesamoid bones or certain carpal bones,

—in short, to be considered as a rudimentary part of the skeleton. It seems to represent the remains of an old phylogenetic element.

Clutton, of London, ²_{Nov. 30, '95} observed two cases of deficiency of the tibiæ. In the first, a boy aged 15 years, there was no tibia, the fibula being the only bone in each leg. The foot had only three toes, articulated at right angles with the fibula. There was unusual development of the condyles of the femur, which were usually pointed in the absence of the tibia. The patella was well formed. Both hands were bifid, two fingers were absent from each hand, and the metacarpal bones on each side of the cleft were fused together. The boy was able to separate the digits to an abnormal degree. In the other case, a girl of 6 years, the feet were at right angles with the fibula. The patella was small. One foot had four and the other five toes. She could get about with great facility, either with a sort of amble or by short jumps.

Thomas Dwight, of Boston, ⁹⁹_{May 2, '95} contributes a test having for its purpose to enable the anatomist to determine the accuracy of measurements of the length of the legs taken during life. The test consists in comparing the differences between the combined lengths of both bones with the differences obtained before dissection. If we find, for instance, that the distance from the spine of the ilium to the inner malleolus is the same on both sides, and then after dissection find that the combined length of the right femur and tibia precisely equals that of the left ones, the presumption is strong that the original measurements were very accurate. The difference between the results he has called "the error." Thus, if the first measurements show that the right leg is 6 millimetres longer than the left and the bones show that it is only 2 millimetres longer, the error is 4 millimetres. If the first measurements show that the right leg is 6 millimetres the longer and the bones show that the left is the longer by 2 millimetres, he adds the differences together and calls the error 8 millimetres. He is not at all sure that in this last point the method is the proper one; but he has adopted it because, by making the error appear as large as it possibly can, it is the severest test of the accuracy of the original measurements. The author has applied this test to 73 bodies, with the results shown in the following table:—

Error in Mm.	Times.	Error in Mm.	Times.
0	8	8	5
1	10	9	7
2	12	10	1
3	3	11	2
4	7	13	1
5	11	18	1
6	2		
7	3	Total	73

The average error was almost half-way between 4 and 5 millimetres; but a better judgment is formed by analyzing the table. Thus it appears that thirty times (that is, in 41 per cent. of the cases) the error was either absolutely *nil* or less than 3 millimetres, which in such coarse work may be called a negligible quantity. Only four times did the error exceed 1 centimetre. In the worst case, in which the error was 18 millimetres, the original measurement made the left leg 1 millimetre the longer, while the left bones were the longer by 19 millimetres. As regards this difference, Dwight thinks that by a blunder 0.1 was put in place of 1.0 in recording the original measurements; nevertheless, this method shows a greater accuracy in measurements made with a tape-measure before dissection than he, at least, was prepared for.

Morestin, ⁷_{No. 23, '94} in a note on the anatomy of the calcaneum, calls attention to the presence, on the lesser process and just to the inner side of the groove for flexor longus pollicis, of a second groove through which passes the flexor longus digitorum. The two grooves are separated in some cases by a ridge, in others by a rough, triangular surface, whose base is directed posteriorly. He then describes the groove of the peroneus longus on the external surface of the calcaneum, and in connection with this subject recalls the fact that on the inferior and external portions of the greater process there is to be found, about once in twenty times, a rounded or oval surface, of varying dimensions, which is, as it were, raised above the level of the surrounding parts, and which is covered with cartilage. It is a friction-surface for the tendon of the peroneus longus, very similar to the one offered by the cuboid. Morestin describes two varieties of it; in the first, the friction-surface, which is located completely at the anterior part of the calcaneum, forms, as it were, a portion of the articular surface by which the latter is in contact with the cuboid; in the second variety the friction-surface is situated from five to twelve millimetres back, and thus is completely independent of the calcaneo-cuboid articulation. A special synovial membrane facilitates the passage of the tendon over this surface.

Morestin, ⁷_{No. 22, '94} describes on the anterior surface of the astragalus, toward the outward portion of the sinus of the tarsus, an articular surface which to the rear is in continuation with the posterior articular surface of the calcaneum, of which it is consequently a dependent. Its aspect is usually forward, at times forward and slightly outward; its height varies from two to twelve millimetres; its breadth varies in the same proportions. It is covered with cartilage and forms an integral portion of the posterior

calcaneo-astragaloid articulation. The synovial membrane of this articulation is inserted into its border, above, within, and without. This articular surface is found not only in the adult, but even in children, when the ossification of the astragalus is not yet complete.

Morestin⁷_{No. 27, '94} communicated to the Société Anatomique of Paris three observations of os trigonum. In the first case the supernumerary bone of the size of a large pea was articulated by amphiarthrosis with the tubercle which limits outwardly the groove of the flexor longus hallucis. In the second case the os trigonum was triangular in shape and was articulated by amphiarthrosis to the posterior portion of the body of the astragalus, to the outer side of the groove of the flexor longus digitorum. In the third case the supernumerary bone was united to the astragalus; a circular furrow, remnant of its anterior separation, was to be seen around the line of union.

Wilmart⁸⁶⁸_{Aug. 3, '95} attributes a mechanical function to sesamoid bones. It seems to him that it solves the following problem in organization from the point of view of locomotion,—namely, to elevate as much as possible, by means of the smallest possible amount of material, a point in the course of a tendon or of a ligamento-tendinous succession.

Articulations.

Edward Fawcett, of Bristol, ²⁷⁷_{Oct., '95} writes on the function of the so-called retinacula of Weitbrecht,—a term applied to bands which seem to form a reflection of the capsule of the hip-joint from its femoral attachment along certain lines to the margin of the articular surface of the head of the femur.

In the adult these bands are normally three in number and are termed upper, middle, and lower. The upper band passes from the tuberculum colli superius along the upper and anterior margin of the neck of the femur as far as the articular cartilage, but before reaching that cartilage becomes firmly blended with the neck of the femur, causing, in the majority of cases, a rough tubercle or, it may be, a ridge extending downward parallel to the anterior intertrochanteric line and lying almost midway between it and the articular margin of the head. The upper band passes from the tuberculum colli inferius to the head of the femur, being practically parallel to the last. The lower band arises from the neck just above the small trochanter and is continued along the lower border of the neck of the femur to the margin of the head.

Fawcett looks upon these bands as a means provided by nature in order to prevent fracture at a time of life when, owing to want of thought, there is most need of it. He looks upon their

arrangement in such definite positions—viz., at the upper and lower margins of the neck of the femur—as pointing to their being of use in limiting excessive strain in certain directions.

The head of the femur from the third to the eighteenth year is united to the neck by a plate of cartilage, thus forming an hyalochondrosis. Now, the strain in walking may be at times excessive upon this union, for which reason the retinacula are chiefly placed at the upper and lower borders of the neck of the femur. In the newborn child there are but two bands, the upper and the lower; but as the child grows older he tends to turn out his toes; so that the head of the femur is less buried in the acetabulum. This causes the strain, or body-pressure, to act no longer in a vertical direction, but downward and forward, and thus the head of the femur tends to be driven downward and forward. In consequence of this a specialization, or shifting, of the lower band occurs and forms what is described as the middle band.

Retinacula of a similar description are found not only in the hip-joint, but also in the shoulder-joint, on the under aspect of the neck of the humerus, in order to prevent too great strain on the cartilage during raising of the arm.

Hartmann, of Rostock, ⁷⁶¹_{B.14,H.2,75} has studied the surgical and topographical anatomy of the tendon-sheaths and synovial bursæ of the foot in 36 adults and 14 newborn infants. He finds that tendon-sheaths are capable of extension only on the side of the ligaments, at what is called their entrance. It is at this place that exudations into the sheath can be first perceived. Only those tendons behind the inner ankle are completely free in their sheaths; all others are connected with their synovial sheaths by vincula and mesotendons.

Gerken, ³¹⁶_{B.30,H.1} writing on the mechanism of the hip-joint, protests against the well-known theory of the Weber brothers concerning the influence of atmospheric pressure. According to him, we should never draw conclusions from cadaveric experiments regarding what occurs in the living person. By experiments on curarized dogs he shows that section of the insertions of the peri-articular muscles suffices to permit of the subsequent easy extraction of the head of the femur from its cotyloid cavity. The fact is that anatomical conditions are completely different on the cadaver from what they are on the living being. In the latter the soft parts of the articulation, in place of being rigid as on the cadaver, are flexible and very vascular, and consequently apt to change in volume; the synovial fluid, too, must be relatively more abundant during life. In the dog the synovia is, during life, at a pressure which varies between four and ten millimetres of mercury,

and it is thus not only capable of counteracting the atmospheric pressure, but even of overcoming the latter, since it is superior to it. According to Gerken, the muscular elasticity and tonicity are especially concerned in maintaining the articular surfaces in apposition, and he considers it to be proved by the cases of spontaneous dislocation which occur after paralysis.

Ligaments.

Lannelongue, of Paris, ³_{Aug. 17, '96} made a communication to the Congress of Gynaecology on the action exerted by the ligaments and capsules of articulations upon the epiphyses during the latter's growth. A comparative examination of the ligamental apparatus of certain joints, at various periods during foetal life and during the period of growth, as well as later on during adult life, led him to think that the articular ligaments, as well as certain tendons, play a useful part in the development of the epiphyses. This part is, however, in no way to be compared to that of the cartilages of the epiphyses, and, in reality, osteogenetic function in any bone remains the exclusive privilege of the periosteum and cartilages. Yet, while the isolated growth of an epiphysis ending in its own form is considered, it is but right not to lose sight of the development of the corresponding epiphysis, which latter must assume a certain shape in order to adapt itself to the former according to a certain determined type of articulation.

The action of the apparatus of conjunction,—that is to say, of the ligaments and capsules,—during the development of the skeleton, consists, above all, in holding together the ends of the bones by the union of one to the other. Lannelongue, however, thinks that it possesses likewise the function of preserving the harmony necessary to the play of the articulations by the direction of the growth in one direction or to another, and especially by preventing it from becoming exuberant where it should not be so.

It seems clear that growth is less active in those points where the cartilages are closely applied one to the other by the ligaments; in any case, on account of this constant connection, the form of one cartilage must be modeled upon the neighboring one. Development in the hand is more active, and a more irregular form in those regions of the epiphyses which are not opposed one to the other; while taking into account certain special actions, as of the muscles, this is undoubtedly one of the reasons for the formation of certain reliefs, of edges, and of projections.

The tendons of muscles inserted upon epiphyses play a similar part, which is natural in view of the continuity of the tendinous

fibres with the cartilage-cells of the centre of an epiphysis in process of development.

Anatomical continuity and common nutrition bring about the parallel development of the two organs. The ligaments, too, end in the embryonic bone in bundles of fibres which terminate in the substance of the bone itself in the form of Sharpey's fibres.

Morestin⁷_{No. 27, '94} discusses the interosseous ligament of the calcaneo-astragaloid articulation. Two fibrous hedges, one anterior and the other posterior, constitute the ligament. These two fibrous hedges, which at their external portion are distant from one another by the entire width separating the two calcaneo-astragaloid articulations, draw gradually nearer to each other as the calcaneo-astragaloid excavation becomes narrower, and finally the two are placed in juxtaposition at the internal portion of the excavation. The posterior of these two ligamentous hedges is usually reduced to a rather narrow band situated at the middle portion of the excavation. The posterior hedge is much more important, but is rarely continuous from one extremity of the calcaneo-astragaloid canal to the other. Almost always it is divided into two thick ligaments, completely distinct, between which the synovial membrane, barely covered by some fat and a few cellulo-fibrous tracts, may be perceived. The external one of these two ligaments is placed at the entrance of the excavation. It is inserted upon the greater process of the calcaneum, outside of the articular surface, which the latter presents for articulation with the head of the astragalus. This external ligament is at times double, presenting a superficial and deeper portion, separated by a little fat in which are found a small artery and several small veins; at times a small serous bursa separates the two portions. When the foot is placed normally the fibres run from below upward and from outward inward; when the foot is carried outward they also run obliquely backward, and when the foot is rotated inward the fibres run obliquely forward.

The internal or deeper ligament, situated to the inner side of the preceding one, differs from it by the direction of its fibres, which run very obliquely from below upward and from outward inward. It is inserted, on the one hand, to the middle portion of the calcanean groove, and, on the other hand, to the farthest limit of the astragaloid groove. This ligament is very strong and resistant. When the foot is rotated outward it is in a condition of great tension, the head of the astragalus becoming strongly prominent externally. The two external and internal ligaments which have just been described are the keys of the infra-astragaloid articulation. In monkeys these are schematic in their clearness.

They are large, strong, and completely separated from one another by a wide space.

Morestin ⁷_{Jan., Feb., '95} describes, under the name of "transverse cuneo-metatarsal ligament," a ligamentous band observed in monkeys, stronger in some species than in others, and extending transversely from the first cuneiform bone to the last four metatarsal bones. It is inserted into the external aspect of the first cuneiform at its anterior extremity, whence its fibres extend outward toward the bases of the metatarsal bones. The anterior fibres are the shorter and the posterior the longer; these latter are quite transverse, while the former are directed somewhat obliquely forward. The ligament is an horizontal membrane, white, shining, and iridescent; short, thick, and contracted at its cuneiform insertion; wider and thinner at the base of the third and second metatarsal bones, and terminating as a point at the base of the fifth metatarsal bone. The ligament is found in man, but in a rudimentary state only, and, consequently, varying as to form, development, and insertions.

Muscles.

Neumayer ³⁷_{Apr., '96} describes, under the denomination of "transverse thyroid muscle," a muscle situated in front of the larynx, springing on either side from the thyroid cartilage to the inner side of the cricothyroid muscle. It is, accordingly, an anomalous mesial muscle. In some cases it is separated at the middle line, being thus formed of two fasciculi, one right, the other left,—or, in other words, it is a double, even, lateral muscle. Its lateral insertion is the same as when the muscle is single, while the inward insertion is on the mesial part of the thyroid cartilage. When the transverse thyroid muscle is lateral, either the right or the left one may be absent. The transverse thyroid muscle is found in 3.15 per cent. of cases, according to Gruber; in 6 per cent., according to Fürbringer.

Morestin, ⁷_{No. 24, '94} who has dissected the digastric muscle in thirty subjects, is inclined to think that the classical description, which gives the intermediate tendon of this muscle as passing through a fibrous loop lined by a synovial membrane, is to be met with, but is very uncommon. In his opinion, the intermediate tendon terminates anteriorly in three varieties of fibres, some being the origin of the muscular fasciculi of the anterior belly, others ending by insertion in the upper border of the body of the hyoid bone, and the third traveling in the direction of the middle line to be united to those of the other side. Some of these transverse fibres give rise to a transverse arch with the concavity directed

backward, which unites the two intermediate tendons at the point of origin of the anterior bellies.

The same author ⁷_{No. 24, '94} reports two cases of anomaly of the digastric muscle in which a certain number of supernumerary fasciculi spring from the anterior belly along the inner border, running inward toward the middle line, where they are either inserted or are continued with those of the opposite side, thus giving rise to an anastomosis between the two muscular bodies. In this connection Morestin recalls that it is frequent enough to come across a fibrous anastomosis uniting the tendons of the digastric at the point where the anterior belly is given off. This fibrous anastomosis is evidently a remnant of the muscular fasciculi described above, and in addition resembles a formation customary in ruminating animals.

Wilmart, ⁸⁶⁸_{Nov. 17, '94} in an article on the action of the intercostal muscles, formulates the following conclusions: 1. All the internal and external intercostal muscles act both as inspiratory and expiratory muscles, at the same time playing the part of a rigid thoracic wall. 2. The internal and external intercostal muscles of the first nine intercostal spaces act as inspirators and expirators by change of the transverse thoracic diameter only. 3. The intercostal muscles of the tenth and eleventh spaces are inspirators and expirators, first by a change in the transverse diameter and then by modification of the longitudinal and antero-posterior diameters of the thorax.

[This, as may be seen, is a new exposition of the opinion set forth by Van Helmont, Arantius, Maryow, and Magendie. My opinion is that too much attention is paid to the intercostal muscles in long and detailed discussions, elucidated by geometrical figures, on the part they may play in the mechanism of respiration. These muscles are in reality anatomical formations tending toward disappearance, as is overwhelmingly demonstrated by their half-fibrous, half-muscular structure; if they are thus atrophied and little by little assuming the character of so-called rudimentary organs, it is precisely because they have no active function to perform. It is well known that they represent, in the thorax, the two muscular layers which in the abdomen form, respectively, the obliquus externus and obliquus internus; these two layers, which on the abdominal wall are continuous and well developed, on the thoracic wall are divided up and deviated from their primary intension by the appearance of the costal arches.—L. T.]

Wilmart, ⁸⁶⁸_{July 6, '96} expresses the opinion that the fibrous intersections of the rectus abdominis prevent variations in position both

of the muscle as a whole and of its edges. They serve thus to assure that function of the abdominal wall which is performed by the muscle; they give as much solidity and as much inextensibility as possible to the insertions of the three flat muscles of the abdomen to the linea alba, and thus, on the one hand, assure the efficacy of contraction of the latter and, on the other, the permanency of the size of the sheath of the rectus abdominis.

[This explanation is in direct contradiction to the ideas of to-day, as generally accepted by morphologists, that the aponeurotic intersections of the rectus abdominis are the remains only of the metameric composition of the muscle. To attribute to them a function is to return to the ancient conceptions of teleology.—L. T.]

The same author, ⁸⁶⁸ Aug. 31, '96 after admitting, in common with all other writers, the homology of the transversalis abdominis and the triangularis sterni, determines the exact mode of insertion of the anterior fasciculi of the diaphragm. This muscle springs exactly from the boundary-line between the abdominal and the thoracic muscles. In a second note he maintains that the two extreme dorsal interossei—namely, the first and the fourth—incline toward the axis of the hand,—the first and fifth metacarpal or metatarsal bones,—and thus diminish the transverse diameter of the distal extremity of the metacarpus or metatarsus. As to the two mesial interossei, if they do not move the bones on which they are inserted, they certainly act as active transversal ligaments of the metacarpus or metatarsus, and strengthen them.

Retterer, ⁹²⁷ Feb. 2, '95 in studying the question of closed cavities around tendons and of bursæ mucosæ, comes to the following conclusions: 1. A layer of embryonic connective tissue precedes the formation of the synovial membranes of tendons and of bursæ mucosæ, as it does that of articular cavities. 2. This embryonic tissue undergoes a special evolution of the so-called mucous variety and ends by disappearing and making way for the cavity itself. 3. Any synovial sheath around a tendon or any mucous bursa passes through a temporary stage which corresponds to the permanent state in which the viscera remain, during their existence, surrounded by loose connective tissue.

Morestin ⁷ Jan., Feb., '96 has seen the levator anguli scapulæ formed by five separate portions. The anomaly existed on both sides. In addition, on the left side a supernumerary bundle of fibres left the spinous process of the seventh cervical vertebra and joined the fourth bundle of the levator anguli scapulæ.

He has also ⁷ No. 27, '94 met with, in two subjects, a supernumerary bundle of fibres in the brachialis anticus muscle which was inserted

on to the radius. In both cases the anomaly existed on both sides and in absolutely the same conditions. The brachialis anticus was divided below into two fasciculi,—a principal fasciculus which, like the ordinary brachialis anticus, was attached to the cubitus, and a supernumerary fasciculus, smaller in size, situated on the outer side of the preceding and inserted on to the radius at the level of the oblique line which runs from the bicipital tuberosity to the insertion of the pronator magnus. It is known that in certain mammifera, and notably in the dog, the short flexor of the forefoot, which is the brachialis anticus in man, terminates, at its lower extremity, on both bones of the forefoot.

Wilmart,⁸⁶⁸
Mar. 30, '95 from his studies on the action of the supinator longus upon the forearm, came to the following conclusions: 1. It is a flexor of the forearm on the arm and, *vice versâ*, a flexor of the arm upon the forearm. 2. It is a pronator of the forearm when the latter is in complete supination. 3. It is a supinator of the forearm when the latter is in complete pronation.

In a second note concerning the common flexor and extensor muscles of the fingers ⁸⁶⁸
Apr. 27, '95 he sets forth the opinion that these muscles are not only flexors and extensors, but also adductors, of the index and of the small finger toward the conventional axis of the hand, which, as is well known, passes through the medius finger.

Morestin,⁷
Jan., Feb., '95 observed, on the left thigh of a man of 45 years, the existence of a supernumerary fasciculus which became part of the extensor muscle of the leg. This fasciculus sprang above, by means of a long and slender tendon, to the antero-superior portion of the coxo-femoral capsule; with a little care the fibres could be followed as far as the iliac bone, where the fasciculus really took its origin on a level with the cotyloid cavity. From this point the muscular fasciculus ran downward and ended on the base of the patellar, uniting to a great extent with the terminal aponeurosis of the vastus externus. Morestin attributes this supernumerary fasciculus to the rectus femoris.

Chudzinski,⁷⁴⁹
No. 7, '94 resumes as follows the morphological variations of the gastrocnemius muscle in the leg: 1. The absolute length of the gastrocnemius is greater in the colored race. 2. This is also true of the tibial portion, though its length is less in women of the black race. 3. The distance from the fleshy part of the gastrocnemius to the heel is greater in the black race and less in the yellow race. 4. The place where the two heads of the gastrocnemius unite is not far from the knee-joint in black women and in white men; it is farther removed in men of the black and yellow races. 5. The fusion of the terminal tendons of the gas-

trocnemius and the soleus takes place lower down in colored races than in the white race. 6. The greatest width of the fleshy portion of the gastrocnemius is more accentuated in those persons who have succumbed in full health than in those who have been invalids; it is less in colored races. 7. The width of the upper extremity of the gastrocnemius is greatest in the white race and least in the yellow. 8. The maximum length of the aponeuroses from which springs the gastrocnemius is found in the yellow race, the minimum in women of the black race. 9. The insertion into the calcaneum of the terminal tendon of the gastrocnemius is almost the same in all races.

Morestin,⁷_{No 27, '94} in a communication on the serous bursæ of the foot, admits the existence of the following, after insisting upon their variability of formation: 1. The bursa of the heel, which is met with about one time out of four, is formed on a level with the internal tuberosity, just below the periosteum and the fibrous tissue which lines it. When well developed it is of the size of a dime. Its shape is not exactly rounded, but rather oval, with the greater axis running antero-posteriorly. It is separated from the skin by the entire thickness of the adipose layer, which implies that ten, fifteen, or even twenty millimetres of fat must be penetrated before reaching the cavity of the bursa. 2. The bursa of the great toe, developed at the level of the metatarso-phalangeal articulation, is subaponeurotic, not subcutaneous, and is found once out of eight or ten times. It is located at the level of the internal sesamoid bone. The collateral internal plantar nerve of the great toe runs along the inner side of the bursa and is almost always in contact with its wall; at times it crosses the cavity of the bursa, either completely free or connected with the wall by a reflection of the latter. 3. The bursa of the small toe, situated on a level with the metatarso-phalangeal articulation. In the adult it is found once out of three times. Like the preceding one, it is subaponeurotic and enters into more or less intimate relations with the external plantar collateral nerve of the little toe. 4. A cuneo-metatarsal bone is constantly found and is situated on a level with the articulation of the first cuneiform bone with the first metatarsal bone. 5. An infra-scapoid bursa situated in the groove of the scaphoid facilitates the passage of the tendon of the tibialis posticus in it. 6. A subcutaneous bursa, rather uncommon, is situated at the base of the fifth metatarsal bone. 7. In the same region a serous membrane between the lower surface of the base of the metatarsal bone and the tendon of the abductor minimi digiti sometimes communicates with a small serous bursa not uncommonly found to the outer side of the metatarsal bone,

somewhat forward of the base, between the bone and a fibrous expansion which frequently extends from the tendon of the peroneus anticus to that of the abductor minimi digiti. 8. At the forward part of the fifth metatarsal bone a small, serous bursa is often found, which, in the majority of subjects, is situated both on the plantar and the outer side of the head of the metatarsal bone. It is placed between the middle of the abductor minimi digiti and the external lateral ligament of the articulation. 9. Finally, serous bursæ are found in connection with the lumbricales muscles, near their insertions into the phalanges. The tendons of these muscles are reflected on the lower surface of the transverse ligament of the metatarsus in order to reach the lateral portion of the phalanges and of the tendons of the extensor muscles. Between the ligament and the ligament of each of the lumbricales is to be found a small serous bursa with the long axis directed according to that of the tendon. This bursa at times is in communication in front of the ligament with the large bursa which divides the two neighboring metatarso-phalangeal articulations, and which extends as far as the upper surface of the ligament.

Morestin⁷_{No. 27, '94} observed a division of the extensor longus digitorum of the leg into two distinct muscles, one being destined for the second and third toes, the other for the fourth and fifth. A connective-tissue interspace, which ascended as high as the upper portion of the leg, divided them throughout their entire length. Morestin adds that this interspace might have misled a surgeon performing ligature of the anterior tibial artery, as it was exactly like the interstice dividing the extensor longus digitorum from the tibialis anticus.

The same author⁷_{Jan., Feb., '95} reports two cases of accessory muscle of the flexor longus digitorum of the leg formed by a single bundle of fibres,—the outer one. The inner bundle was almost totally absent. He adds that this is the customary arrangement in the monkey.

Arterial System.

L. Emmett Holt, of New York,⁵¹_{Nov., '95} observed the following malformation of the heart in an infant, 9 months old, who had been cyanotic since birth and who died with all the symptoms of extreme marasmus. At the autopsy all the organs were found to be normal except the heart and lungs, the latter being in a condition of marked congestion, but without atelectasis. The apex of the heart was broad. The aorta was five-eighths of an inch in diameter and arose from both ventricles, the origin being directly over the ventricular septum, but more from the right than from

the left ventricle. The pulmonary artery was about one-fourth the size of the aorta; it admitted only a very fine probe, and was so small that probably no blood passed through it during the life of the child. The ductus arteriosus was open, the diameter being about one-twelfth inch. The right ventricle was much larger than the left and its walls were twice as thick. The ventricular septum was deficient at its upper extremity, the opening being one-half inch in diameter. The right auricle was much enlarged; the left auricle small. The pulmonary veins were very small. The foramen ovale was closed and the auricular septum normal. The systemic circulation was carried on chiefly by the right ventricle, and the chief supply to the lungs was probably by the bronchial arteries.

In the discussion Packard reported a case of patent foramen ovale and deficiency in the ventricular septum occurring in a sailor. McDonald mentioned a case with but one auricle and one ventricle, who lived to be 12 years old, dying of pulmonary congestion. The only symptom during life was cyanosis.

George N. Acker, of Washington, D. C., ⁵¹_{Nov., '96} reports the following case of cardiac anomaly: The patient was a female child, aged 6, who had been cyanotic since birth and who for years had suffered from "spells in which she seemed to be dead." After an attack of influenza there occurred daily epileptoid attacks. There were likewise present dark-blue pulmonary hæmorrhages, occurring daily, and passage of blood by the bowels. The child finally died comatose. At the post-mortem examination there was found in the brain a collection of grumous blood near the anterior part of the right temporo-sphenoidal lobe, just back of which was an abscess containing greenish pus, which bacteriological examination proved to be due to the pneumococcus. The malformations of the heart and great vessels were as follow: The foramen ovale was patulous and one-half inch in diameter. The interventricular septum was incomplete in the upper part, where there was an opening one-half inch in diameter. The pulmonary artery arose from the left ventricle in the usual aortic situation as a *cul-de-sac*, with one rudimentary valve. On the corresponding internal ventricular surface was a dimple. Repeated attempts failed to discover even the slightest communication with the artery. The aorta sprang from the conus arteriosus of the right ventricle. The ascending aorta was one inch in diameter, with walls not abnormally thickened; the valve-segments were of the usual thickness; the right coronary opening was large, the left quite small. From the upper curve of the transverse portion of the arch there arose six branches,—three large and three small. The innominate, left

common carotid, and left subclavian arteries were identified without difficulty; the remaining three vessels were situated immediately to the right and in front of the innominate, and, from their position and relative size, it was supposed that the right one (the larger) and the left one (the smaller) communicated respectively with the right and left lungs, and were non-obiterated fifth primitive aortic arches. The sixth vessel was the smallest and the most obscure, and its distribution could not be given. From the upper curve of the left division of the pulmonary artery was a narrow vessel communicating with the branch of the aorta destined for the left lung. It was undoubtedly the ductus arteriosus. To a very limited extent it was patulous at its pulmonary end; at its aortic end there was only a dimple and valve-like pad. Both ventricular walls were one-fourth inch thick. Both the systemic and pulmonary blood must have passed through the aorta, which was accordingly enlarged. The blood returned from the lungs through the usual pulmonary veins, and from the system by the venæ cavæ.

Crawford, of Cedar Rapids, Iowa, ⁶¹_{Aug. 24, '95} observed the following remarkable case of visceral anomaly in a girl who died at the age of 16: There was marked deformity of the chest, which was narrow and protruding in front, and also protruded posteriorly in a veritable visceral hump or dome. The heart, immensely enlarged, filled the entire left side of the thorax; it was turned half over to the right, with the left ventricle in front, extending diagonally across the chest downward and to the right, bringing the apex well over in the right side. No left lung could be found. On the right side of the thorax, behind the apex of the heart, was a double lung, consisting of two long, narrow lobes side by side, connected in the middle for about two-thirds of their length, and seeming to have about the capacity of one normal lung. The heart measured nine inches in length and six inches in width and weighed three and one-fourth pounds. But one auricle existed, opening into both ventricles. It would probably hold one and one-half pints when distended. The auriculo-ventricular valves, especially the mitral, were very defective. The ventricles were greatly hypertrophied, especially the left. The aortic and pulmonary valves were intact. The arch of the aorta was dilated, but beyond this the aorta was remarkably small. The liver was enlarged, extending entirely across the body, with the gall-bladder on the left side. The stomach was long and intestinal in shape. Three distinct spleens were situated on the right side, and they were hypertrophied. The kidneys were about double the normal size.

Edward Fawcett, of Bristol, ²⁹⁷_{Oct., '95} looks upon the usual description of the intra-cranial course of the ophthalmic artery and its relationship to the optic nerve as erroneous. According to his observations, the artery arises from the top of the internal carotid artery; that is, from the middle of the upper aspect, from that part known as the fourth bend, though its distance from the optic foramen may vary somewhat, being sometimes nearer, sometimes farther off,—a variation which has an important bearing on the relationship between the artery and the optic nerve. From its origin the ophthalmic artery always passes forward for a short distance,—on an average, one to two millimetres; then it suddenly bends outward, after which, proceeding more gradually outward, it enters the optic foramen.

The relationship of the ophthalmic artery to the optic nerve is dependent to a great extent on the length of the interval between the point of origin of the artery and the margin of the optic foramen. In most cases the origin is so situated as to lie below the middle of the longitudinal axis of the optic nerve, and, as that nerve passes obliquely backward and inward toward the chiasma, the artery, which passes straight forward at first, comes to lie below the *inner* half of the nerve, and, in many cases where the straightforward course of the artery is somewhat prolonged, it actually appears on the *inner side* of the nerve, after which it gradually passes away to the outer side, so that it comes to lie below the outer half of the nerve at its entrance to the optic foramen.

If the origin of the artery be somewhat farther back than usual, the artery may not reach the inner side of the optic nerve; and, likewise, if the origin of the artery be farther forward than normally, the inner side of the optic nerve will be quickly reached and the re-appearance of the artery on the outer side of the nerve correspondingly delayed.

The possibility of such a course for the artery depends upon the falseness of the generally accepted description of the optic chiasma as lying transversely in the optic groove. Such, however, is the conclusion to which the author has come, agreeing with Lawrence, who ²¹⁴⁸_{May, '94} remarks that in some recently observed specimens the commonly accepted position of the commissure upon the optic groove was departed from, and that, although the number of cases examined was too small to justify the statement that the commissure never lies upon the optic groove, he believed that such would be found to be the case.

Debierre ⁹²⁷_{Jan. 12, '95} discovered an anastomotic canal, one centimetre in length and from four to five millimetres in diameter, connecting

the femoral artery and vein to one another, at the bend of the groin. The same anomaly existed on the opposite side, but the anastomotic canal was narrower. The foramen ovale was likewise found to be still present in the same subject.

Morestin⁷_{p. 660, '94} has seen the lingual artery springing from the external carotid artery one centimetre below the hyoid bone. From that point it turned forward and upward, lying on the external surface of the hyoglossus muscle until it reached the level of the lesser cornu of the hyoid bone, where it entered between the basioglossus and keratoglossus muscles to resume its usual course. The dorsal artery of the tongue, which habitually springs from the lingual, sprang directly, in this case, from the external carotid artery. On the opposite side the arteries followed their usual course.

Hocquart and Wilmart⁸⁶⁸_{Oct., '94} publish the following arterial and venous anomalies: 1. Thyroid artery of Neubauer. It sprang from the middle part of the innominate artery, and turning upward ran along the middle line of the trachea back of the thyroid venous plexus. It gave off several branches above the thyroid gland, one of which, the largest, was destined for the left lobe of the gland, and the others, slenderer, for the right lobe. The diameter of the artery was the same as that of the inferior thyroid arteries, which were well developed. 2. Anomaly of the brachial artery. The axillary artery ended in two branches,—a superficial one, which corresponded to the brachial artery less its branches, and a deeper artery whence sprung the subscapular, posterior circumflex, superior profunda, and several muscular branches for the biceps, the coraco-brachialis, and the brachialis anticus. 3. Absence of the posterior tibial artery. It was replaced by the peroneal artery. Two popliteal veins were found in this subject. 4. A case of double popliteal vein. 5. Anomaly of the dorsalis pedis artery. The artery was exceedingly slender. It was partly replaced by the anterior peroneal artery, which was more developed than is customary.

Morestin⁷_{Nos. 19, 27, '94} describes two cases of internal lateral mammary artery, in the first of which the anomaly was bilateral; the lateral internal mammary artery sprang on either side from the subclavian, on a level with the inner border of the first rib. On both sides the arteries were of the same length and calibre, occupied the same position, and their course entered into exactly the same channels. The abnormal artery extended to the fifth intercostal space, where it divided into two branches, one joining the corresponding intercostal artery just above the fifth rib; the other communicated, on a level with the sixth rib, with that branch of

the fifth intercostal nerve which follows the upper border of the rib. In the second case internal lateral mammary artery was likewise found on both sides. The origin was the same as in the previous case, but the artery ran only as far as the fourth intercostal space. It was accompanied by two veins throughout its course. Morestin found this internal lateral mammary artery in the *Macacus rhisus*, but he looked in vain for it in other species of monkeys.

[It is easily understood that, besides the purely anatomical interest which such a curious anomaly presents, it has a certain importance from a surgical point of view; in fact, the internal lateral mammary artery might be a cause of much trouble during an operation upon the ribs or the pleura, and it is well to be forewarned of the possibility of its existence.—L. T.]

Faure ⁷_{Jan., Feb., '95} reports a case of anomaly of the right subclavian artery, which sprang from the aorta behind and to the left of the left subclavian artery. Thence it ascended very obliquely upward and to the right, and, as is habitual in such cases, passed between the œsophagus and the vertebral column, which latter was crossed at the level of the fourth dorsal vertebra. The brachiocephalic trunk (arteria innominata) was, of course, missing, and the right common carotid sprang from the arch of the aorta.

Fayet ²²⁰_{Jan., '95} discovered in the same subject the following anomalies: A superficial ulnar artery, a femoral artery passing through the adductor magnus toward the middle of the thigh; a more than ordinarily developed peroneal artery replacing in part the posterior tibial artery, which consisted in a small artery of the size of a pin; a presternal muscle extending from the inferior extremity of the right sterno-mastoid to the sternal insertions of the left pectoralis magnus.

Corson, of Savannah, Ga., ⁵⁹_{Dec. 28, '95} noted the following abnormal situation of the brachial artery in a negro, aged 55, who presented an appearance of premature senility: The left brachial artery was subcutaneous, and could be picked up between the fingers and compressed from its origin at the lower border of the teres major to the bend of the elbow, thus stopping all circulation in the forearm and arm.

Waldeyer ⁹⁰_{Dec., '95} looks upon the ordinary account of the obturator artery as incomplete, and describes the termination of the artery as follows: The obturator artery divides while still in the obturator canal, but close to its femoral extremity, into two terminal branches,—the anterior and the posterior. The anterior sends a branch to the symphysis and courses along the anterior circumference of the obturator foramen. The posterior divides

into three branches,—(1) the acetabular; (2) the internal, which runs on the inner surface of the obturator membrane to the tuber ischii, and (3) the external, which runs on the outer surface of the obturator membrane in the same direction as the internal. It is thus the chief artery of supply to the whole of the ischium, and the nutritive twigs are mainly derived from the internal branch of its posterior division.

C. O. Hawthorne²¹³_{Nov., '95} showed a male patient, aged 45, presenting an abnormal condition of the arteries of the left upper extremity. The left brachial artery divided into two branches on the inner side of the biceps muscle, half an inch above the internal condyle. The larger branch, which represented the ulnar artery, descended superficially in front of the muscles arising from the internal condyle, and could be seen and felt immediately below the skin as far down as a point three inches above the wrist-joint. Below this the vessel was more deeply situated. The smaller of the two branches formed by the division of the brachial passed from its origin almost directly downward for about half an inch and then turned somewhat abruptly outward, disappearing behind the bicipital fascia, presumably dividing into the radial and interosseous arteries. The radial artery in the lower part of the forearm occupied its usual situation. Where superficially placed, the arteries were tortuous and pulsated visibly.

E. Fawcett, of Bristol,²⁷⁷_{Jan., '96} observed, in a dissection made by two students, the following abnormality of the hepatic artery: In the first place, an arterial circle was found around the portal vein, made up of the following vessels in front,—a small vessel springing from the celiac axis and apparently ending by anastomosing with a large branch of the superior mesenteric artery. The remainder of the circle was formed by the trunk of the superior mesenteric, the abdominal aorta, and the celiac axis. Fawcett was at first inclined to look upon the whole thing as being simply another instance of an hepatic artery arising from the superior mesenteric; but, on closer observation, it became evident that the small cross-branch between the celiac axis and what appeared to be an hepatic branch of the superior mesenteric was in reality the normal hepatic artery, which at some time had blended with the superior pancreatico-duodenal artery. The blood, having now found a more direct route than by the usual course, had caused the inferior pancreatico-duodenal artery to dilate and the true hepatic artery to shrink. The arterial system, beyond the point of junction of the inferior pancreatico-duodenal artery with the true hepatic artery, is evidently that developed in connection with the hepatic artery. Thus there could be seen, coming off at the junction of the true hepatic

artery with the apparent one, the gastro-duodenal artery, which, after a course of about an inch, divided into the gastro-epiploica dextra and the superior pancreatico-duodenal. This last vessel was small and, passing behind the superior mesenteric vein, ended by anastomosing with the inferior pancreatico-duodenal near its origin from the superior mesenteric.

François ³⁵⁶_{v.18, No.4} publishes a long article on the development of the vessels and blood in the great omentum of the rabbit. His conclusions are as follow: 1. The vascular net-work of the great omentum of the rabbit grows by means of the terminal extremities of pre-existing vessels, of collateral buds, and of independent vascular elements called vasifactive cells and net-work. The terminal extremities of the vessels and the buds change into capillaries in three different ways: (a) they successively become hollowed out, (b) primary vascular vacuoles are formed, which unite secondarily, and (c) degeneration of the axial protoplasm occurs. 2. When a capillary terminates a vascular expansion, both the artery and the vein of the latter originate in this capillary, which explains their being habitually side by side. 3. The existence of vasifactive cells independent of the general vascular net-work cannot be gainsaid. These elements are all of the same kind and possessed of the same characteristics as the vascular expansions. They are to be found from birth, as are the vasifactive net-works to which they give rise. 4. A single cell may suffice to produce a vasifactive net-work. It is accomplished in exactly the same manner as is the extension of the vessels and capillary net-works of the general circulation,—namely, by the formation of vascular expansions. 5. The canalization of the cells and vasifactive net-works is accomplished by the production of primary vascular vacuoles, which secondarily unite, or by degeneration of the axial protoplasm. 6. The milky spots of Ranvier are spots of connective tissue. They take no part either in the development of the endothelial sheaths of the vessels or in that of the vasifactive cells and net-works. Perhaps they may take part in the formation of the other vascular coats and of the collections of fat of the great omentum. 7. The vasifactive net-works are not the only ones to be met with in the great omentum. Others are also to be found in the course of a capillary or at the extremity of a small vein or artery, or finally in the course of a capillary connecting an artery and a vein. 8. The vasifactive cells and net-works and the vascular expansions of the vessels possess likewise an hæmatopoietic function. They produce red blood-corpuscles. The latter are intra-cellular in nature and contain no nucleus. No white blood-corpuscles are formed by the vasifactive net-works along with the red blood-corpuscles.

Genito-Urinary Apparatus.

Schuhl⁹⁹⁶_{Dec. 24, '94} reports two cases of double bicornate uterus. In the first case the length of the uterus was twenty-three millimetres; a depression of two millimetres in depth existed on its fundus. In each of the two cavities of the uterus two longitudinal ridges with palmate folds were found. In the second case the woman in whom the malformation was discovered was pregnant, suffering from pulmonary tuberculosis and from vicious pelvis due to a rachitic kyphoscoliosis. Delivery took place prematurely, the child weighing 1550 grammes (3 pounds) and presenting by the breech. The vaginal partition was completely ruptured during the expulsion of the child. Schuhl calls attention to the premature delivery and the breech presentation, which may have been caused by the double uterus, for in this malformation one of the uterine horns may not distend sufficiently to contain a full-sized fœtus, giving rise, in consequence, to premature expulsion. With regard to the presentation, it is possible that the cavity of the gravid uterine horn, though being elongated in shape, may not be more developed above than below, when a breech presentation will more frequently occur than if the uterus were normal.

M. P. Jacobi, of New York,²⁷_{Oct., '96} reports a case of absent uterus in a girl of 17, the so-called vaginal opening leading directly into the bladder.

Barth,³¹_{Dec. 1, '94} after numerous researches on the structure of the ureter in man, points out: 1. The presence, on the renal papillæ, of an epithelium similar neither to that of the straight tubes nor of the calices, the pelvis, or ureter. 2. Change of the type of superficial epithelial cells at the point where are situated the projections, which are placed where the calices open into the pelvis. 3. The habitual presence of more or less perfect mucous glands in the pelvis and ureters, in greater number in the upper part of these canals than in the lower, where they are finally completely wanting. 4. Presence of papillæ in the upper portion of the canal, chiefly at the narrower points, except toward the inferior extremity, where they do not exist. The papillæ contain special cells, which cannot be proved by a direct histological method to be nerve-cells, though everything induces one to think that they are organs of sense. 5. Cysts of the ureters, which, from the nature of their epithelial lining, seem to have developed from previously existing cavities, and, consequently, furnish an indirect proof of the existence of glands.

Soulié¹⁴_{June 5, '96} reports a case of double ureter in a fœtus. It is probable that these organs were developed from the same Wolffian canal at but a short distance apart, and that a new partition was

formed between the two ureters after separation between the Wolffian canal and the ureters had occurred.

Griffon and Morestin⁷_{No. 17, '94} each report a case of double ureter.

[It is well known that this anomaly is exceedingly frequent, and the foregoing reports serve but to increase, without advantage to science, the already large number of double ureters.—L. T.]

J. Zedel, of Bremen,³⁹³_{B. 32, H. 2, '95} reports a case of pseudohermaphroditismus femininus externus, with persistence of the cloaca, bicornate uterus, double club-foot, and of congenital wryneck. Hallopeau¹⁴_{Apr. 10, '95} reported to the Academy of Medicine the case of a male pseudohermaphrodite. As happens almost always in such cases, the external genital organs of the patient possessed all the characteristics of the female, except that in each of the cutaneous cysts representing the labia majora was placed an ovoid body, which was a testis and which, consequently, decided the sex. Speaking of this case, Hallopeau criticises the terms of male or of female pseudohermaphrodite, which are customarily used to designate the malformation in question, and proposes to substitute for them the words of "androgyné" and "gynandre," of which the first root would denote the real sex, the second root the added attributes. Among pseudohermaphrodites all would be androgynous who possess testes and all gynandrous who possess ovaries.

Rouffart⁹⁹⁶_{May 10, '94} having had the opportunity of examining histologically the atrophied testis of a pseudohermaphrodite who outwardly seemed to belong to the female sex (labia majora and minora, very short urethra, rudimentary vagina, etc.), discovered the presence of spermatozoa in it. The tunica albuginea was somewhat thickened; the parenchymatous region was normal in aspect, the connective elements being increased in number and the constitutive elements of the seminiferous tubes being unchanged.

Arène²²⁸_{Aug. 15, '96} reports in detail the case of an individual, aged 40, possessing all the anatomical and physiological characteristics of a pseudohermaphrodite. Arène does not venture to decide as to the real sex. At first sight the patient would seem to belong to that class known as "proper pseudohermaphrodites" (Pozzi) or "apparent hermaphrodites in the male sex" (Laugier), but certain characteristics—such as the existence of the menses, the fineness of the skin, the rounded limbs, the shape of the thighs, the size of the breasts, the sexual desire which attracts the patient toward men, and the mode of venereal orgasm—would seem to place the subject in the opposite category,—the "apparent hermaphrodites in the female sex" (Laugier).

The patient suffers from Bright's disease, and Arène is waiting for the autopsy to definitely settle the question. The patient is

taciturn, sad, sombre, of varying moods, and inclined to suicide. The influence which genital malformations exert upon those suffering from them has long been known.

Péan¹⁰_{Apr. 2, '95} reports the case of an individual who had always been looked upon as a male until the age of 15. While operating to discover the testes, which were missing from the scrotum, he found a small uterus accompanied by its appendages, which were but slightly developed, especially to the left. Péan concludes from this case that in doubtful cases it is impossible to found one's decision as to the sex solely on the conformation of the external genital organs.

Müstakov, of Kazanlük,¹²¹¹_{June, July, '94}; ¹⁰⁹_{Mar., '95} reports an interesting case of hermaphroditism in a child born in February, 1894. When examined, it was seen that the anterior abdominal wall was extremely thinned and flabby, the whole abdomen forming a huge pendulous hernia. The symphysis pubis was absent, and through the gap, measuring five or six centimetres transversely, the lowest portion of the abdominal sac hung downward, dividing the perineum vertically into two distinct regions. The right perineal area was occupied by a set of female external genitals with quite naturally developed major and minor labia, clitoris, circular hymen, and urethra (discharging urine). A normal anus was situated about one-half centimetre behind the vulva. A good-sized penis and scrotum occupied the left perineal region. No trace of testicles could be discovered in the scrotum. The prepuce was well formed, but the site of the external urethral orifice showed only a small pigmented spot.

Lagneau¹⁴_{Apr., '95} showed drawings representing the genital organs of two hermaphrodites, both inscribed as girls at their birth. In them the vulvar fissure existed between two labia or two lobes of a bifid scrotum. One of them suffered from hypospadias and cryptorchidism; the other had a testis in one of the so-called labia. They were thus males in reality. Lagneau makes the remark that such cases are by no means common, but he wisely adds that it is not possible to make a correct statistical table concerning them, even with the use of the tables coming from the military revising councils, since many such individuals, being inscribed as females, are not obliged to go before the council. The statistics of such revising councils inform us that this malformation is found in about 5 per 1000 of rejected individuals.

Englisch³¹_{Nov. 28, '94} states that there exist at present thirteen observations of an anomaly of the penis, consisting of a canal opening at varying distances from the meatus on the glans or penis. This canal runs mesially under the skin and ends in the penis by a

cul-de-sac. Meisels looks upon this canal as a double urethra and furnishes a proof of his opinion. The anomaly is important from a practical point of view, since the canal may be affected by itself or together with the urethra. It is, however, more difficult to obtain a cure of the abnormal urethra, and infection is easier. Treatment consists in the extirpation of the entire course and in application of sutures.

Joseph Griffiths, of Cambridge, ²_{Nov. 30, '95} read before the British Medical Association a paper on the anatomy of the genito-urinary organs in the boar and the pig, with references to the effects of castration. A comparison between the accessory sexual glands, the prostate and Cowper's glands, and the muscular fibre surrounding the intra-pelvic portion of the urethra, in a boar and in a full-grown pig castrated when young, clearly showed the all-important influence which the testes exert upon the growth and development of such glands and of the striped muscle surrounding the urethra.

Kossmann and Nagel ³¹⁷_{Nov. 19, 42, '94; No. 2, '95} discuss the meaning of the para-urethral ducts in woman. According to the former, they are identical with Wolff's ducts, which, when they persist, open into the sinus uro-genitalis between the urethral orifice and the introitus vaginae. Nagel, however, looks upon Wolff's ducts as having no part in the growth of the vagina, and regards the para-urethral ducts as efferent ducts of little acinous glands or as diverticula of the mucous membrane of the urethra.

Kirmisson ¹⁴_{July 31, '95} communicated to the Académie de Médecine the case of a little girl whom he had operated upon for epispadias and malformation of the external genital organs. The labia majora were drawn far away from one another, meeting neither in front, where was to be found a complete mesial fissure separating completely the two labia minora and dividing into two halves the clitoris and its prepuce, nor in the rear to form the posterior commissure. Through this fissure the vesical mucous membrane projected, and during any effort urine was thrown out in a large stream. Below this gaping urethra was a punctiform opening, which was the entrance of the vagina. At the rear end of the slit the relaxed anus allowed the prolapsed mucous membrane to pass through. The malformation is very similar to exstrophy of the bladder, but differs from it by the existence at the anterior extremity of the fissure of the symphysis pubis, firmly fastened, behind which the finger could be introduced by the urethral orifice into the bladder.

A cure was obtained by an autoplasmic operation, which consisted in splitting the separated parts in such a way as to obtain

two flaps, one of mucous membrane, the other cutaneous, which were placed face to face on the middle line. The procedure used should be classified among those consisting in the superposition of two layers of flaps. The operation replaced the gaping fissure by a solid floor; the prolapsus of the rectum did not recur, but the incontinence of urine persisted.

Lutz, of St. Louis, ¹³⁹_{Dec., '96} reports a case of cloaca in a woman aged 22. The vaginal and rectal outlets adjoined each other without the intervention of a perineal body. Behind the rectal outlet there existed a circular depression, around which the fibres of the sphincter ani could be felt. An operation was performed with the result that the patient obtained perfect control of the faeces and that sexual intercourse was possible.

Bull, of New York, ²_{Sept. 14, '96} reports an almost similar case in a girl of 14, who was operated on in the following manner: The rectum was dissected free from all its surroundings for one and one-half inches; an incision was made directly backward, splitting the perineum to the centre of the sphincter; to this latter—its normal position—the rectum was transplanted, and the wound was closed anteriorly with seven silver-wire stitches as a lacerated perineal wound is closed. Recovery was complete, both as to appearance and function.

Sykes, of Galveston, ¹³⁹_{v.1, p.85} reports the case of a woman in whom coitus was performed, impregnation resulted, and delivery was effected through the anus. The external genital organs were in aspect those of a virgin. The rectum and vagina formed a common cloaca, opening through the anus and separated from one another from half an inch to an inch below the os uteri by a membranous curtain representing the upper third of the recto-vaginal septum.

Blacker, of London, ²⁷⁷_{Jan., '96} read before the Anatomical Society a paper on the topographical anatomy of the fourchette, which he finds is variously described by different authors. From observations which he has made on three hundred and ninety-seven women and from observations by other authors he tends to look upon the fourchette as forming in reality a part of the labia minora. The terms "anterior" and "posterior" commissure could well be given up, the former being replaced by the term "mons veneris" and the latter not being required, as it is applied by some to the fourchette, by others to the perineum.

Morgan ²_{Nov. 30, '96} showed before the Clinical Society of London an infant, aged 18 months, with the following anomalies of the external genitals: On each side was a large and well-formed mass of scrotal tissue containing well-formed testes with spermatic cord

and vas deferens. These were separated from each other at their upper extremity by two well-formed penes, measuring about three-fourths inch in length. Each was attached to the ramus on either side, and in neither was there a urinary meatus. Below the root of these two organs was a prominent mass of tissue about three-fourths inch in length, forming a pouch of skin, in the centre of which was a firm and more fibrous body attached just below the two penes and lying between the two scrotal prominences, but divided from them by a deep sulcus. Back of this finger-like process was a mass of skin and subcutaneous tissue covered on its posterior surface with what looked like mucous membrane. It resembled a small mamma, with prominent, bluish nipple. Below and in front of the anus was a prominent mass of mucous membrane, red and vascular in hue, and protruding when the child cried. Along its right was a small slit admitting a probe into a long, narrow cavity passing vertically upward for two inches, which was evidently the mucous membrane of the bladder, as from it the urine drained when the child was at rest, and when it cried the urine could be seen coming in jets from the orifices of the ureters.

Soulié ⁹²⁷_{Apr 27, '96} communicated to the Société de Biologie the results of his researches on the migration of the testis. He found, from his examination of very young fetuses, that the inguinal canal is preformed, and is filled, as is the scrotum likewise, with a gelatinous connective tissue. Nowhere is there any insertion in any region, upon the skin of the scrotum, of a bundle of fibrous tissue. The gubernaculum testis is formed by the proliferation of a growth (processus vaginalis) which leaves the testes while yet in the abdomen and descends into the preformed inguinal canal. This growth, at first composed of connective tissue, becomes fibrous tissue later on. As it makes its way in the inguinal canal little by little it draws after it the peritoneum; in this manner the tunica vaginalis and the vagino-peritoneal serous duct are formed. Toward the end of foetal life, when the testis has almost completed its descent, the growth finally becomes fastened to the skin of the scrotum and forms the ligament known as the gubernaculum testis. As may well be seen, the retraction of this ligament plays no part in the migration of the testis, since the latter takes place previous to the complete formation of the ligament.

Füth, of Metz, ³¹⁷_{B. 18, H. 14} describes an interesting case of vesical anomaly in a 4-month-old male child. At the autopsy the bladder was found to be formed of two portions of about the size of a walnut, communicating, in the neighborhood of the apex of the

trigonum, by a round opening one-half centimetre in diameter. Each portion had a ureter opening into it, and from the extremity of the left portion the urachus ascended to the navel. The urethra opened into the same portion below the opening communicating with the other half of the bladder. The division between the two portions of the bladder was formed by a septum advancing from the rear wall almost as far as the apex of the trigonum.

Joseph Griffiths ¹⁷⁸_{V.9, Oct., '94} describes the nerve-supply of the muscles of the bladder and urethra and discusses the functions of the nerves. From experiments performed he is led to ask whether the common form of retention of urine after operations is not the result of inhibition of the muscular wall of the bladder rather than of undue activity of the striped muscles of the urethra.

Keibel, ²¹⁴⁷_{'96}; ⁹⁰_{Dec., '96} from studies made on a collection of human embryos placed at his disposal by His, demonstrates the fallacy of the generally accepted statement that the bladder is developed from the allantois. He finds that it is formed from the anterior section of the cloaca. The cloaca is divided by two lateral folds uniting into an antero-posterior septum; into an anterior part, the urogenital sinus, which is transformed into the bladder and urethra, and a posterior part, the rectum. This throws light on the pathology of epispadias and explains the occasional occurrence of a congenital cleft in the lower part of the anterior wall of the abdomen, for the cloacal membrane, which was formerly supposed to occupy only a small area, is asserted by Keibel to extend from the region of the coccyx almost to that of the umbilicus. This cloacal membrane eventually disappears, and the cloaca thus formed is divided into two portions by two lateral septa, the anterior portion forming the rectum and the posterior the genito-urinary sinus. The genital eminence appearing at the anterior end of the genito-urinary sinus, a lack of fusion of the grooves of the under surface of the eminence and of the margins of the genito-urinary sinus gives rise to hypospadias; the same phenomenon occurring above the genital eminence gives rise to epispadias or congenital cleft of the abdominal wall.

Aschoff ²⁰_{B.128} discusses the mucous membrane of the urinary canal in children, and concludes that the pelvis of the kidney, the bladder, and the ureter in females are destitute of glands; however, from time to time, some closed solitary glands are found in the mucous membrane of the pelvis. In male children that portion of the urethra corresponding to the prostate gland is enveloped by the latter on its posterior surface; the mucous membrane of its anterior aspect is furnished with glands similar to those which exist posteriorly; these anterior glands are, however,

tomique of Paris. The single kidney lay very low in front of the vertebral column, with its concavity at a level with the origin of the iliac arteries. The left part, corresponding to the left kidney, was much lower down than the right. There were two renal pelves and two ureters.

A. Lambert⁵⁹_{Aug. 3, '95} presented to the New York Pathological Society a rather rare congenital formation,—viz., entire absence of the right kidney and ureter. There was a suprarenal capsule on the left side, but no kidney or ureter in the normal location. A small kidney was found in the hollow of the sacrum. There was one large, thick ureter.

Ballowitz²_{Sept. 7, '95} has collected, as far as possible, all recorded cases of congenital absence of one kidney, and finds that the deficiency was more common on the left than on the right side. The renal vessels were generally absent, as also the ureter, on the abnormal side. The solitary kidney was almost always normal in shape and position, but much enlarged; microscopically the enlargement would seem to be due rather to hyperplasia than to hypertrophy. The bladder, except for absence of the opening of one ureter, was generally normal. In a large number of cases there were associated deformities of the organs of generation, especially in the female, and these were almost invariably on the side of the renal defect. The author points out the practical bearing of the matter,—for example, the probability of calculus causing sudden suppression of urine in such cases,—and also the danger of surgical interference, and suggests the possibility of diagnosing the condition by ascertaining the absence of the opening of one ureter in the bladder by means of the cystoscope, and also the likelihood of its occurring where any abnormality of the genital organs is found, especially if this be unilateral.

Nervous System.

The recent literature bearing upon the central termination of the sensory pathways is reviewed by Adolph Meyer,²⁶³_{Jan., '95} who expresses the view that the discussion on the subject seems to have come nearer a conclusion. There were practically two views represented. Flechsig and Hösel maintain that fibres which come from cells of the nuclei of Goll and Burdach and form the inter-olivary stratum and the fillet terminate in the parietal region of the cerebral cortex. Von Monakow and Mahaim, on the other hand, state that there is no direct connection between the fillet and the cortex, but that the connection is indirect, by means of the optic thalamus.

Bielschowsky⁷⁵_{v. 14, p. 206} examined two dogs' brains, in which Goltz

had removed one hemisphere with the corpus striatum in one case and both hemispheres with the corpora striata in the other. The first dog lived two years and five months after the operation, the second nine months after removal of one and two months after removal of the other hemisphere. In both dogs the optic thalamus was not injured, but showed secondary atrophy (just as in von Monakow's experiments); the fillet, however, was neither atrophic nor degenerated; hence the conclusion that the fillet is merely a connection between the nuclei of Goll and Burdach and the optic thalamus, and that a second nerve-cell is needed for the connection between the optic thalamus and the cortex.

The greatest and most valuable material has been published by M. and Mme. Dejerine. ⁹²⁷_{Apr. 6, '95} They have no less than 9 cases in which the fillet was involved and 19 cases in which the fillet might have been involved, if Flechsig and Hösel's views were correct. Their cases allow the following conclusions: 1. In 2 cases with a lesion of the nuclei of Goll and Burdach, there is (ascending) degeneration of the fillet; the degeneration cannot be followed beyond the subthalamic region and the inferior part of the optic thalamus. 2. In 3 cases the fillet is destroyed in the region of the pons. The consequence is a descending degeneration, involving the interolivary stratum on the same side and the arcuate fibres and nuclei of Goll and Burdach of the opposite side, and an ascending degeneration, which can be followed only as far as the anterior corpora quadrigemina and the inferior part of the optic thalamus, but leaves completely intact the fibres passing through the lenticular nucleus, the nucleus of Luys, the globus pallidus, and the commissure of Meynert. 3. In 4 cases lesion of the region of the optic thalamus is followed by a slight atrophy of the mesial fillet, diminishing downward as we approach the nuclei of Goll and Burdach. This atrophy belongs in the category of "*atrophic cellulipète*," described by Forel. There is no reason to believe that the cells of the fibres that atrophy apparently downward must be located in the thalami; at any rate, most of the fibres of the fillet come from the cells of the nuclei of Goll and Burdach. 4. Among the 19 cases of lesion of the motor and parietal area, there is especially one which seems very conclusive. The whole external aspect of the left hemisphere and the orbital surface of the frontal lobe were softened; the central ganglia were, however, not involved. The patient had had right hemiplegia with total aphasia for eleven years. The secondary degeneration involved the radiations of the thalamus, of the internal and external geniculate body, the fibres to the pons and medulla, the pyramidal tract, etc.; a total degeneration of the internal capsule, of the crus

cerebri, the locus niger, and part of the red nucleus. With all this, the fillet was intact and also the aura lenticularis. A drawing in Dejerine's "*Anatomie des centres nerveux*," vol. i, p. 180, gives the whole plan of the sensory pathways as it follows from his cases.

Jakob's paper ⁷⁵_{v.14,p.208} appeared before Dejerine's, and adds another case in favor of von Monakow's view; his remark, that the central sensory-nerve cell might be located in the globus pallidus, cannot be upheld by facts, and does not invalidate the view of von Monakow and Dejerine, which may be summed up as follows: 1. The periphery sensory element is a spinal-ganglion cell. 2. The first central sensory-nerve cell is a cell of the nuclei of Goll and Burdach, which helps in forming the fillet of the opposite side and ends in the optic thalamus. 3. The higher central sensory-nerve cell is situated in the optic thalamus, and sends its process to the cortex of the parietal lobe.

F. W. Mott, of London, ⁴⁷_{p.68,96} concludes, after an experimental inquiry upon the afferent tracts of the central nervous system of the monkey, that the column of Goll is chiefly composed by the fifth, sixth, and seventh subthoracic roots, and few fibres enter this column above the fourth subthoracic. After uncomplicated unilateral section of a large number of posterior roots there is no degeneration in the opposite posterior column. This is opposed to the report of Oddi and Rossi and Löwenthal. When the nucleus of Goll is destroyed the degenerated fibres extend in the fillet as far as the optic thalamus, and not beyond, thus confirming the opinion held by Dejerine from the study of secondary sclerosis in man and by von Monakow from experiments on animals. After unilateral section of roots degenerated fibres were found in the opposite antero-lateral column; but, as such fibres were not always present, he attributes their origin to cells of the gray matter of the same side as the lesion, and he thinks that these cells have been damaged by vascular changes in the gray matter as a result of the operation; he does not believe that any long, ascending fibres in the antero-lateral columns or the posterior column of the opposite side arise directly from posterior roots. After median longitudinal section in the lumbar region for three-fourths inch he has found a symmetrical degeneration in the antero-lateral tract of the two sides. There are two sets of fibres here, one of which can be traced to the vermis, the other (column of Gowers and Edinger) to the corpora quadrigemina. Experiment has shown that this tract of Gowers and Edinger has probably nothing to do with the conveyance of faithful impressions. One-sided or double division of the antero-lateral portions of the cord produces no obvious effect on sensation. The function of this tract is unknown.

Kuilhan²¹⁰¹_{B.7, No. 6} publishes a detailed article on the development of the cerebellum, the following being his principal conclusions: The cerebellum is at its appearance an uneven formation, but later on it passes through a period during which it is composed of two parts. It may be traced through five phases of evolution: 1. During the phase of the uneven layer the cerebellum appears as an uncomplicated arched layer, placed above the origin of the fourth ventricle, and of almost the same thickness in the middle line as on the sides. 2. When the duplication of the cerebellum begins to be evident the layer greatly increases in thickness on the sides, while in the middle line it becomes much shallower. 3. When the phase of duplication is complete the cerebellum is constituted by two thick layers of tissue connected by an exceedingly slender bridge. 4. The two layers unite posteriorly in such a way that the groove formed on the ventral side of the cerebellum vanishes. Anteriorly this groove persists a long time, and in the sheep vanishes but a short time after the appearance of the vermis. At the beginning of this phase there are to be found neither circumvolutions nor vermis. These latter appear at a relatively late period, when the even layers are united posteriorly and a distinction between vermis and hemisphere can be perceived only when the chief circumvolutions are to a certain degree manifest. 5. In the fifth phase any trace of even forms of organ disappear and the mesial ventral groove is completely filled up anteriorly.

J. N. Langley, of Cambridge,¹⁷⁸_{Oct. 15, '94} contributed observations upon the secretory and vasomotor fibres of the hind-foot of the cat, which may be summarized as follows: The origin of the secretory nerves from the spinal cord varies with the arrangement of the lumbo-sacral plexus. The lumbo-sacral plexus may be divided into classes according to the relative size of the strands sent by the sixth lumbar and by the upper branch of the first sacral nerve to the sciatic. These may be farther subdivided. With an anterior plexus the third lumbar is the last spinal nerve to contain secretory fibres; with a posterior plexus the fourth lumbar contains secretory fibres, and even the fifth lumbar may contain a few; with a median plexus there may or may not be a few secretory fibres in the fourth lumbar. The probable relative number of secretory fibres in the more effective spinal nerves with each class of plexus is given. The eleventh thoracic nerve has sometimes a few secretory fibres. The upper effective spinal nerves often cause most secretion on the inner part of the foot, the lowermost on the outer part of the foot; this is due to the upper nerves sending their secretory fibres chiefly to the sixth (or, sometimes, the seventh) lumbar ganglion, and to the lowermost nerves sending their secretory fibres chiefly to the

second (or, sometimes, the first) sacral ganglion. The area of the foot supplied with secretory fibres by the sixth lumbar, seventh lumbar, first sacral, and second sacral ganglia, respectively, varies also with the arrangement of the lower lumbar and sacral nerves; and, broadly speaking, the more anterior the nerve the more the area supplied by the second sacral ganglion is limited to the outer margin of the foot, and the more posterior the plexus the more the area supplied by the sixth lumbar ganglion is limited to the inner margin. With a median plexus and with others not too widely different from it, the whole of the secretory area of the foot is supplied by each of the four ganglia,—sixth lumbar to second sacral. This does not mean that each gland is supplied with nerve-fibres from each source, but only that in each part of the foot—inner, median, and outer—one or two glands at least secrete on stimulating the gray ramus of each ganglion. The area of skin supplied by the gray ramus of each ganglion corresponds in the main with the area of skin supplied by the homologous posterior-root fibres. But in the limbs the areas of the gray rami overlap more than do the sensory areas as described by Sherrington, while in the trunk they overlap less. Stimulation of the lower lumbar sympathetic on one side causes sometimes a slight secretion on the foot of the opposite side, in consequence of some decussation of fibres in the sacral ganglia. In certain circumstances stimulation of from the sixth lumbar to the second sacral nerves in the spinal canal causes some secretion; this is due to direct stimulation of sympathetic fibres which have joined these nerves outside the spinal canal, and not to the presence of secretory fibres in the nerve-roots.

Dogiel³¹⁶ shows that the elements of ganglia attached to Meissner's and to Auerbach's plexus have the characteristics of common sympathetic cells. They possess: 1. Branched protoplasmic prolongations, which terminate not by coming into contact with neighboring elements, but outside of the enveloping sheath. 2. A prolongation in the form of an axis-cylinder, which leaves the ganglion and ends in another, more or less distant, ganglion, having followed the nervous cords of the plexus. This prolongation is often divided opposite the nodal points of the plexus. In addition it throws off, during its course, collateral branches which end, like the original, in pericellular net-works in contact with ganglion-cells. Besides the ganglion-cells there are to be found, in these intestinal plexuses, multipolar elements which were looked upon by Cajal as nerve-cells. Dogiel, having described their characteristics and their distribution, comes to the conclusion that they have no immediate connection with the nervous elements of the sympathetic plexuses. They are to be found in connection

with blood-vessels, and they constitute Cajal's so-called interstitial ganglia.

C. S. Sherrington, of London, ¹⁷⁸_{Oct. 15, '94} summarizes an elaborate study of the nerves of the skeletal muscles as follows: 1. In a muscular nerve-trunk from one-third to one-half of the myelinate fibres are from cells of the spinal root-ganglion. 2. These fibres range in size (in fresh preparations) from 1.5μ to 20μ in diameter. 3. The largest of them are not the largest fibres in the muscular nerve-trunk; the largest in the nerve-trunk come from the ventral (motor) spinal root. 4. The largest root-ganglion fibres in the muscular nerve are larger than any fibres in the cutaneous nerves of the limb and than any in the articular nerves examined. 5. The smallest myelinate fibres in the muscular nerve are for the most part, perhaps entirely, root-ganglion fibres. 6. Macroscopical nerve-trunks are, as regards their myelinate fibres, in no case purely motor; all are sensori-motor or purely sensory. Such nerves as the phrenic, hypoglossal, recurrent laryngeal, and posterior interosseous contain abundance of fibres from sensory ganglia. 7. For the root-ganglion fibres in the muscles a special end-organ exists; this is the so-called "muscle-spindle" (Kühne). 8. The muscle-spindles lie quite numerous imbedded in the muscular tissue, and are especially frequent in the neighborhood of aponeuroses, tendinous intersections, and tendons. 9. The majority, perhaps all, of the larger root-ganglion fibres in the muscular nerves terminate in "muscle-spindles"; the small nerve-fibres do not appear to end in spindle-organs; some seem to terminate, after branching, in free fibrils. 10. After section of the nerve supplying the muscle the muscle-fibres inside the spindles do not degenerate like the fibres composing the rest of the muscle. 11. The skeletal muscles and their primitive fibres can attain a very complete structural development in the absence of the spinal cord and its roots. 12. The peripheral limb-nerves contain no myelinate fibres derived from the sympathetic system, but they contain large numbers of pale fibres; all their sympathetic fibres must therefore be among these. 13. In the lumbo-sacral region there exist recurrent fibres in the ventral spinal root, as shown in other regions by Waller, Schiff, and others. 14. Schäfer's ganglion-cells in the ventral spinal root, although many of them lie in proximity to the recurrent sensory bundle in the root, do not, for the most part, appear to be connected with those fibres. 15. In the lumbo-sacral nerves near their commencement exist a few minute and scattered myelinate fibres which do not degenerate after section of the nerves at their origin; the fibres appear related to the sheaths of the nerve-trunk, and may be "sympathetic." 16. All the fibres of

the dorsal (posterior) spinal roots of the sacro-lumbar nerves remain sound (apart from traumatic degeneration for a few millimetres) on the distal (ganglionic) side of a section carried out between the ganglion and the cord; all on the spinal side degenerate. 17. Four to seven weeks after excision of the spinal root-ganglia large numbers of minute myelinate nerve-fibres (less than 4μ) exist in the proximal (spinal) end of the dorsal (posterior) spinal root; these fibres resemble regenerate fibres.

Jacques, ⁸¹_{May 20, '95} used Ehrlich's and Golgi's methods in order to examine, in the rat and the newborn cat, the way in which nerves are distributed in the uterine tube. His chief conclusions are as follow: First there is to be found a peritoneal plexus extended below the endothelium, and composed of very fine and exceedingly varicose fibrillæ, running parallel to the axis of the tube, and forming meshes whose greater axis runs in the same direction. Below this plexus the serous membrane is lined, throughout its entire depth, with fibres running lengthwise and crosswise, which, in a transverse section, are perceived as dots and sinuously curved lines. Next is to be found a plexus formed of irregular meshes, in which Remak's fibres principally take part and which contains but few nuclei. It extends throughout the peritoneal cellular layer, by the side of the chief arterial branches. It is to be looked upon as the fundamental plexus whence spring the nerves both for the tissues of the Fallopian tube and for the peritoneum which covers the latter. It is situated somewhat more superficially than the vessels which it covers. From this plexus, as well as from the intra-ligamentous plexuses, there spring numerous branches which are distributed to the subjacent muscular layer, thus generally extending in a transverse direction. These branches, when considered as a whole, constitute an intra-muscular plexus whose fibres are exceedingly numerous, ramified, running together in parallels, but perpendicularly to the fibres of the peritoneal plexus. Their finest ramifications end in varicose extremities placed among the unstriated muscular fibres. Here and there, following treatment with silver, cell-like forms are to be observed under the epithelial coating; these Jacques thinks may be due to imperfect reductions. Nowhere could he, either by Golgi's or by Ehrlich's method, discover ganglion-nerve cells, either under the serous membrane or in the thickness of the walls of the tube.

Bonnier, ⁴⁵²_{Nov., Dec., '94} in a long article on the labyrinthine nerve, seeks to explain its morphological and physiological meaning, relying on several confirmations from other better-known nervous apparatuses. He first establishes the fact, by means of proofs from the anatomy, histology, and development of the nerve, that it is

the morphological equivalent of a posterior root of the spinal nerves, and that it contains all the elements of one. According to Bechterew there are two varieties of fibres in the posterior roots,—namely, the fine, inner ones, which are thicker, are covered with myelin previously to the others, and which, for the most part, run toward the base of the posterior cornu and especially toward the collection of large cells known as Clarke's vesicular column, where central prolongations are sent forth, especially toward the cerebellum; the other fibres, which are small and slender and only tardily covered with myelin, terminate, in part, in the posterior caput cornu.

The labyrinthine nerve, too, contains two groups of fibres which correspond to each of the two preceding groups. Thus the vestibular nerve, the inner root of the auditory nerve, is formed of thickened fibres which are soon covered with myelin, and which run toward what in the medulla oblongata corresponds to the columns of Clarke, and thence to the cerebellum. On the other hand, the cochlear nerve, outer branch of the auditory nerve, is formed of slender fibres which only tardily are covered with myelin, and which end in the anterior nucleus and the auditory tubercle, which are but the prolongation into the medulla oblongata of the posterior cornu.

Bonnier states precisely the connections between the nerve-centres and the vestibular and cochlear nerves. After having sketched the profound changes which the gray substance of the cord undergoes when passing from the cord to the pons Varolii, he enumerates the various nuclei of origin of the auditory nerve,—namely: (1) the inner nucleus, or Bechterew's nucleus, or Deiter's nucleus, which is derived from the base of the posterior cornu, and (2) the anterior nucleus and the auditory tubercle, which morphologically belong to the caput of the posterior cornu. The first, or basal, nuclei of these two varieties receive the thick fibres of the vestibular nerve, which correspond to the inner thick fibres of the posterior roots; the two other nuclei, or nuclei of the caput, receive the slender fibres of the cochlear fibres, which are the equivalent of the slender outer fibres of the posterior roots.

Leaving their nuclei of origin, which in reality are but nuclei of interruption, the nerve-fibres of the auditory nerve run, for the most part, toward the encephalon, and the comparative study of the road which these fibres follow induces Bonnier to announce the following conclusion: The vestibular nerve ends mostly in the cerebellum and the cochlear nerve in the cerebrum. To state it otherwise, the first is cerebellous and the second cerebral.

Finally the cerebral fibres of the auditory nerve end in the

parietal and temporal lobes. Bonnier thinks that he can go even farther in cortical localization, from conclusions drawn from the brain of Adolphe Bertillon. It is known that Bertillon had retained the use of the right labyrinthine nerve only. A noticeable hypertrophy of the lower two-thirds of the ascending parietal lobe is to be noted on the left side of the cerebrum, while on the right side they are atrophied. It would accordingly be reasonable to conclude that the ascending parietal lobe is the cortical centre of the fibres of the vestibular nerve. Bonnier calls attention to the fact that in this region too the fibres which constitute Goll's column terminate, after having passed through the fasciculus gracilis of the medulla oblongata.

The second part of Bonnier's article, which is completely devoted to physiology, is given up to an interpretation of the function of the nuclei and of the conductors just described as constituting the labyrinthine nerve. Viewed as a whole, the auricular apparatus has a double object, namely: 1. To give information as to the attitude and variations in attitude,—*i.e.*, the active and passive movements of the segment of the body which contains the hearing apparatus. 2. To give information, on the other hand, as to pressure and variations in pressure of the surrounding medium. The following are, according to the author, the different forms of these two great functions: 1. The ampullary crests, by their combined analytical powers, furnish impressions of attitude and of variations in attitude of the cephalic segment, together with the direction, duration, and rapidity of its changes in position. This is its direct subjective function,—a function purely subjective, in fact, and entirely devoid of any objective basis. It supplies images of attitude and movement in a space without objective significance or sensory aspect. 2. The utricular macula informs us as to the tension and variations of tension of the labyrinthine and endocranial fluids, which latter communicate with each other (manoæsthetic function). 3. The utricular macula likewise gives information as to the variations in tension due to the variations in pressure of the surrounding element, especially where such variations are slow (baræsthetic function). 4. The saccular macula, as well as the otocystic macula, enables us to appreciate the incidence of shocks; they supply the ideas of external objective localization. This function may be called "objective orientation." 5. The spheroidal tympanum which covers it renders it accessible to rapid variations in external pressure, such as jars, which are perceived as such analytically (seisæsthetic function). 6. The cochlear papilla perceives these same jars, and classes them not, like the saccula, according to the rapidity of their succession, but according to the acuity of the tonal sensa-

tion, of which this spiral papilla is the seat whenever the shocks attain a certain rapidity (auditory function). 7. All papilla covered with inert formations and especially with otoliths are sensitive to trepidations communicated to the inertia of these productions through the subjacent osseous wall (sismæsthetic function). 8. Finally, to the objective orientation, which enables us to locate, with reference to ourselves, that portion of space which has been affected, there corresponds inversely indirect subjective orientation, which enables us to define our own position in a portion of space objectively known. This is also another auricular function.

Coyne and Cannieu³⁷_{May, '95} give a summary of their investigations on the membrane of Corti. Examining, in the first place, the insertion of this membrane, they reject Löwenberg's opinion, that the outward extremity of the membrana tectoria is attached to a ridge depending on the ligamentum spirale. They likewise disagree with the generally accepted opinion according to which Corti's membrane ends above the sensory epithelium, which constitutes the organ of Corti, by a more or less rounded free border. They look upon the membrane of Corti as ending on a level with the first few rows of the cells of Claudius, to which it is intimately connected. As regards the structure of the membrane, the authors recall the fact that, viewed from above, it shows a great number of lines running through its substance. These lines, which are placed exceedingly close to one another toward the inner insertion of the membrane, run outward in fan-like shape, becoming farther apart from one another. A species of plexus exists toward the outer insertion. A radial section, made perpendicularly to the surfaces of the membrana tectoria, still shows the lines running from the protuberance of Muschka, to the organ of Corti. By their union they form three separate layers: a superior and an inferior layer, which are narrow and very shallow, and a middle layer, which is wider, lighter in hue, and more transparent than the other two. Sections tangential of the cochlea, passing through the membrane of Corti, show that this latter is constituted by partitions circumscribing polygonal spaces. The partitions, where they come together, form bodies of variable sizes, which show more darkly under the action of the various coloring reagents used. The membrane of Corti is, consequently, formed of a number of polygonal cavities bounded by partitions; they are seen to be of more extensive dimensions the nearer one comes to the organ of Corti, and of less extensive dimensions the nearer they are to the superior limiting layer. The vibratile cilia of the sensory cells of Corti are contained in the interior of these cavities. This form of structure explains readily the appearance shown by other sections of the

membrana tectoria. The fibrils correspond to the lines of union of the partitions, and the light-colored, transparent substance which unites them corresponds to the partitions themselves.

Siebermann³²⁰₉₄ publishes an article on the formation of the middle ear and of the ossicula auditus, of which the following are the chief conclusions: 1. The point where the stapes is to be formed appears, in the human embryo, at the beginning of the fourth week, under the form of a richly nucleated layer of blastema situated on the dorsal wall of the first pharyngeal pouch. At the beginning it is totally separated by mesodermic tissue from the blastema of the labyrinthine capsule, in the point where the future fenestra ovalis will be formed, though in other localities it is in connection with the capsule. It is not the same as the precartilaginous stapedia ring, for this latter is formed in the thickness of the former, and only toward the end of the fifth or the beginning of the sixth week. The stapedia ring of the sixth week bears the same relations to the blastema of the fourth week that the cartilage of Meckel does to the entire blastema of the entire branchial arch. 2. During the fourth week the spot where the precartilaginous incus and malleus will be formed is occupied by a diffuse blastema belonging to the zone of dorsal union of the first arch with the second. No special cellular grouping indicates, even during the fifth week, the formation of these two ossicula. 3. The precartilaginous mandibular and hyoid arches are found during the first half of the sixth week. At the same time all the ossicula are constituted, likewise in a precartilaginous shape. Their shape is already extremely analogous to what it will be in the adult, and they form a continuous chain extended between the dorsal extremities of Meckel's and of Reichert's cartilages, to which it is united. Between the stapes and Reichert's cartilage, as well as between the malleus and Meckel's cartilage, a less differentiated precartilaginous connecting piece of tissue exists. 4. The stapes is side by side with the labyrinthine capsule, but can be readily distinguished from it. There is no occasion for holding, with Gradenigo, that its base is of different origin from its ring. 5. It is to be noted that that portion of the labyrinthine capsule corresponding to the base of the stapes—that is to say, the region of the fenestra ovalis—is transformed later on directly into connective tissue, after having passed through the precartilaginous phase. 6. From these observations it is not possible to precisely state to which of the two branchial arches such or such an ossiculum belongs, for all these elements—Meckel's and Reichert's cartilages, incus, malleus, and stapes—appear almost simultaneously, and form a long, continuous, horseshoe-shaped chain. The two end-branches

of the chain extend, it is true, one into the first arch, the other into the second arch; but the pieces in the middle may more reasonably be looked upon as independent, rather than as being a portion of one or the other of the two arches. 7. The tympanum is derived from the first entodermic pouch; from the sixth week onward the Eustachian tube is added to it. The latter's walls are formed and extended by the increase in thickness of the lateral walls of the pharynx. The Eustachian tube is not, then, in man, a simple narrowing of the lower part of the first branchial pouch. 8. The external surface of the membrana tympani does not correspond to the obturating layer of tissue. It is marked out on the ventral wall of the extremity of the branchial pouch by the external auditory meatus at the beginning of the sixth week.

Westphal³⁶⁸_{B.26,H.1} discusses the conditions of electrical excitability of the peripheral nervous system, considered in their relations to the anatomical constitution of such system, as existing both in the adult and in the child. He proves that the medullary sheaths differ exceedingly in the newborn child from what they are in the adult. They are narrower, are interrupted in places, and are arranged in all irregular ways. Coloring reagents affect them differently,—osmic acid, for instance, stains them usually of a greenish- or yellowish- gray hue, instead of the fine-black hue which is produced in the adult; chromic acid does not color them in yellow, though carmine colors them red and nigrosin blue. If they are treated by Weigert's or Pal's method, the decoloration effected by the hæmatoxylin is carried out with extraordinary rapidity and intensity.

The peripheral nerves, which as yet do not possess their medullary sheaths, show no annular constrictions. The nuclei of the sheath of Schwann are both more voluminous and more numerous than in the adult, and are surrounded by protoplasmic masses. There are many individual variations in the development of the medullary sheath. The development is most active from the third to the sixth week; usually it is completed by the second or third year.

The difference is not so great as regards the muscular system. In the newborn child the diameter of the muscular fibres is less,— 26μ instead of 30μ . Most are rounded, instead of polyhedric, in shape. The nuclei of the sarcolemma are remarkable for their volume, standing out clearly on the slenderness of the fibres; they are frequently arranged in series or files. The interstitial tissue, likewise, abounds in many nuclei.

Finally in the newborn infant and in youth the electrical excitability of the nerve is less than in the adult. This is probably

due to the development of the medullary sheaths being still incomplete at that period of life. According to Bechterew, nerves are excitable only when their medullary sheaths have attained a certain thickness.

Gastro-Intestinal System.

Thomson, of Oxford, ²_{Nov. 30, '96} criticizes the generally accepted system of topographical anatomy of the abdomen. As essential to any satisfactory system, he lays stress on the following points: The delineating lines should pass through fixed points. These fixed points should be readily accessible without undue exposure and disturbance of the patient in bed. The lines should be straight, and not curved. The following fixed points are suggested: (1) the centre of the articulation between the lower end of the sternum and the ensiform cartilage, (2) the antero-superior iliac spines, (3) the most dependent part of the tenth costal arch, and (4) the symphysis pubis.

The delimiting lines are as follow: Two horizontal lines are carried across the surface of the abdomen,—one on a level with the most dependent part of the tenth costal arch, this one being called the subcostal line, and the other, called the interspinous line, connecting the two antero-superior spines of the ilium. Lines are drawn from the centre of the xiphisternal articulation to the antero-superior iliac spines on either side. These are called the ilio-sternal lines. In this way a triangle is constructed, the base of which corresponds to the interspinous line, while the sides are formed by the ilio-sternal line. By such an arrangement of delimiting lines the surface-area of the abdomen is marked off into ten regions, which are thus denominated:—

Regio hypochondriaca dextra.	Regio epigastrica dextra.	Regio epigastrica sinistra.	Regio hypochondriaca sinistra.
Regio abdominis lateralis dextra.	Regio umbilicalis dextra.	Regio umbilicalis sinistra.	Regio abdominis lateralis sinistra.
	Regio inguinalis dextra.	Regio inguinalis sinistra.	

With little difficulty lines in correspondence with the foregoing can be marked off on the back of the trunk. Thus the middle line of the back, on a level with the inferior angles of the scapulæ when the arms are by the side, corresponds fairly accurately to the centre of the xiphisternal articulation, while the position of the antero-superior spine can be determined by draw-

ing a line across the root of the back a finger's breadth below the level of the postero-superior iliac spines, the middle third of this line corresponding to the interval between the two postero-superior iliac spines, and the extremes of its outer thirds overlying the spot on the back of the body, which agrees with the position and level of the antero-superior spine.

Sernoff, of Moscow,⁸⁰³_{B. 11, '94}⁹⁹_{Dec. 6, '94} employed the following method in studying the topography of the folds of the jejunum and ileum: In order to fix the gut and mesentery he injected a 12-per-cent. aqueous solution of pure chromic acid through the femoral artery with moderate pressure for an hour and a half or two hours, the circulation in the extremities being prevented. The subject was then left in a cold room for four or five hours, at the end of which time the intestines and mesentery should be of the consistency of gutta-percha. Sernoff found that in subjects so treated the valvulae conniventes were found as much in one part of the intestine as in another, but less regularly transverse below than above. In all parts of the gut there are places quite without valves, which usually occur at the convexity of folds, and this fact leads Sernoff to look upon the valves not as fixed, unchangeable structures, but as more like the folds in the stomach, depending on the condition of the muscular coats. With relation to the arrangement of the coils of the small intestine, Sernoff recognizes five groups of folds: 1. Those at the top, just below the transverse colon and its mesentery. These are always horizontal and transverse. 2. Those of the true pelvis, which are also horizontal, though some run backward and forward. 3 and 4. The folds to the right and left of the spinal column, which are always vertical. 5. Those in the middle, at the front of the abdomen, which are absolutely without order. One point may be looked upon as constant,—namely, the termination of the ileum, rising from right to left out of the true pelvis, turning over its edge to meet the cæcum.

Berry³¹⁶_{No. 24, '95}⁹⁰_{Dec., '95} publishes an article on the anatomy of the vermiform appendix, the statements in which are partly based upon his investigation of one hundred bodies and partly on comparison of his own results with those obtained by other observers. The average length in Berry's own cases was 8.3 centimetres, and the average in all observations 9.2. One appendix Berry found to measure but 3.1 centimetres. With reference to sex, he gives the length of the appendix in the male as 8.6 centimetres, and in the female 8 centimetres. The greatest length seems to exist between 20 and 40 years. In fifty-five cases the external diameter of the appendix was about 6 millimetres at the base and centre, and 5 millimetres at the apex, being about 1 millimetre wider

in the male than in the female. The valve seems to be an inconstant structure of no importance whatever. Berry asserts the correctness of the generally accepted statement that the cavity of the appendix is obliterated at or shortly after middle life, and looks upon the obliteration as a physiological process.

J. M. Swan, of Philadelphia, ¹¹²_{Dec., '96} reports a case of congenital absence of the vermiform appendix in a male subject aged about 40 years.

B. Robinson, of Chicago, ⁹⁶_{Sept., '96} gives the name of "navel-loop" to the bowel-loop supplied by the superior mesenteric artery, inasmuch as man is the only animal in which this bowel-loop, during embryonic life, protrudes at the navel and returns to the peritoneal cavity about the eighth week of gestation. It is almost exclusively the part of the tract which is engaged in the peculiar phenomenon of rotation brought about by growth changes. Only two portions of the navel-loop have a mesentery, the small intestine (mesenterium) and the transverse colon (mesocolon), the middle portion being fixed to the immovable abdominal dorsal wall. Anomalies of the navel-loop and its mesenteries are not very uncommon. They arise chiefly from inflammation occurring during early embryonic life, between the eighth and sixteenth weeks, and consist either in non-descended colon, excessive descent of the colon, or in the anomaly known as mesenterium commune. Within normal limits the length of the navel-loop varies greatly, being between twelve and thirty-four feet in length, or a difference of twenty-two feet.

The same author ²²⁴_{Nov. 16, '96} publishes an article on the peritoneum of the dog. He urges that students who intend to become abdominal surgeons should be taught to properly experiment on dogs, as he thinks that visceral anatomy can be well and profitably studied on them. From the autopsies of dogs who died of peritonitis he learned the following facts respecting the great omentum: 1. It is the great peritoneal protector against infectious invasions. 2. It is ready to move to any spot which may be infected. 3. It is the surgeon's friend; it prevents the adhesion of the intestines to the anterior abdominal wall.

Brindeau ²⁴_{Jan. 20, '96} communicates two observations of Meckel's diverticulum, found in newborn infants. In the first case the diverticulum was located about twenty-five centimetres above the cæcum, floating freely in the abdominal cavity. Its length was about three centimetres and its diameter about that of the small intestine. In the second case the diverticulum, which was eight millimetres long and five millimetres wide, opened into the cavity of the ovum, forming a stercoral fistula; the child died on the fourth

day after birth. Concerning the conduct to be followed in a similar case, Briudeau recommends the following rules: When the fistula discharges only mucus and very little fæcal matter, there is no danger in delaying until the child be sufficiently developed to support the operation; but when almost all the fæcal matters are voided by the orifice, as in the foregoing case, much of the small intestine and all the large intestine are suppressed. Even in such a case he considers it preferable to wait until the newborn child has attained the weight of a full-term child before operating.

Faure ⁷_{Jan., Feb., '95} showed an anomaly affecting the location of the cæcum and of the lower extremity of the ileum. The cæcum, which otherwise was normal, was situated very high up, on a level with the upper border of the iliac bone and the lower end of the kidney. Below it the lower extremity of the ileum, which is usually freely floating in the abdominal cavity by reason of its mesentery, was held firm in the internal iliac fossa under the peritoneum, which maintained it in the angle between the psoas and the iliacus muscles, no mesentery existing in that situation, though it occupied its normal position, crossing obliquely the anterior surface of the lumbar vertebræ and ending on a level with the right sacro-iliac symphysis. From this point only was the ileum free, possessing a mesentery. Beyond, for about twenty centimetres, it was firmly fastened behind the peritoneum, its deeper surface being in contact with the cellular tissue and the fascia iliaca.

Byron Robinson ¹¹⁵⁰_{Oct., '95} gives the measurement of the small intestine in 113 cases taken while the intestines were lying in the abdomen and still attached to the mesentery. By cutting the intestine away from its mesentery over 6 feet would sometimes be found added. The longest adult intestine measured 32 feet, and the shortest $10\frac{1}{2}$ feet, giving a difference of $21\frac{1}{2}$ feet. At birth the small intestine measured 10 feet, on an average, varying between $6\frac{1}{2}$ and 12 feet. From the fact that the small intestine grows most rapidly during infancy and childhood, or even almost entirely at that age, Robinson looks upon a short intestine in the adult as due to deficient nourishment and disease during childhood. The small intestine in the male was 5 feet and 3 inches longer than in the female. In the measurements 1 foot was allowed for the duodenum. The average length of the mesentery was 7 inches. In 87 males the longest was 10 inches and the shortest 5 inches, and in 26 females the longest was 11 inches and the shortest 5 inches. In adults the measurement of the small intestine shows no relation between length and weight, age, or height.

Draike, of Moscow, ²¹⁴⁵_{'94} has measured the length of the intes-

tines in one hundred and four bodies of children and sixty-five bodies of adults, and comes to the following conclusions: In children sex has no influence upon the length of the intestine; in adults, however, they are longer in men than in women. Children have relatively longer intestines than adults. The large intestine is relatively longer in adults than in children, in comparison to the small intestine. Morbid changes in the intestine in children cause their lengthening. Patients dying of phthisis and emaciation have comparatively shorter intestines than other patients. Nationality appears to have no influence on the length of the intestine in these cases.

Kirmisson ⁸⁵³_{July, '95} reports the case of a child suffering from absence of the anus and rectum, with absence of the thumb and a slight degree of balanic hypospadias. The interest in this case is chiefly surgical. Kirmisson made an artificial anus in the left iliac fossa. The operation was followed by death.

Dide ⁷_{No. 18, '94} observed, at the autopsy of an epileptic and hysterical woman, the presence of a stomach which had remained in the foetal state. At first sight it looked like a tube of the size of the œsophagus. Its dimensions were as follow: From the cardia to the pylorus, 13 centimetres; greatest diameter, from the convexity of the greater tuberosity to the pylorus, 18 centimetres; vertical diameter (middle part), 4 centimetres. This arrest in development was found in an individual suffering from mental degeneration.

Funck-Brentano ⁹⁹⁶_{Nov. 10, '94} discovered, at the autopsy of a child who died ten days after birth, that the œsophagus ended in a blind pouch on a level with the third dorsal vertebra. Below the lower portion of the œsophagus was to be found a tube communicating below with the stomach and above with the bronchial tubes, but having no communication with the upper part of the œsophagus. The other organs were normal, excepting the left kidney, which was situated in the neighborhood of the sacro-iliac articulation, and which received its blood-vessels from the neighboring arterial trunks.

Miscellaneous Malformations.

Féré ¹⁴_{June 5, '95} noted in a chick an example of polydactyly consisting in the division of the articulation of the hind-claw. In addition, on both sides but one phalanx was well developed in this claw; only traces of a second phalanx could be discovered under the nail. The simultaneous existence of the two malformations—brachydactyly and polydactyly—is uncommon in teratology.

Demme ³¹_{Nov., '94} observed a case of syndactyly and polydactyly in two sisters in whose family there had never been any other mal-

formation. The syndactyly existed on both sides, affecting the third and fourth fingers. A membrane existed between the thumb and index. The elder girl suffered likewise from syndactyly of the second and third toes, and the younger girl from syndactyly of the first three toes.

Claisse⁷_{No. 25, '94} describes the following malformations observed at the autopsy of a child of 9 years. There were two spleens, which together weighed seventy grammes, besides numerous small supplementary spleens. The heart weighed one hundred and fifty grammes. There was almost complete absence of septum. The auricles communicated freely with one another, as well as the two ventricles. Both the arterial trunks sprang from the right; the aorta, which was dilated at its origin, suddenly grew smaller after having given off the larger arteries. The ductus arteriosus, which at either extremity was permeable, was closed in the middle. The pulmonary artery, of normal size, was exceedingly narrow at its origin; this narrowing was due to the thickened and sclerosed sigmoid valves, which were altered, especially toward their free border. The circumference of the orifice at the base of the valves was three centimetres and hardly two centimetres at the free border.

Le Bec⁹⁹⁶_{Apr., '95} reports the case of a full-term child who suffered from the following malformations: Umbilical hernia, incomplete development of the rectum, absence of the anus, and exstrophy of the bladder. The penis was represented by two red, rudimentary outgrowths; the glans likewise; the scrotum by two cutaneous sacs, the right one only containing a testis, the left testis having remained in the abdominal cavity. The pubis was missing on the right side; on the left it was flat and shapeless.

Hue²⁰³_{July 1, '95} showed before the Société de Médecine of Rouen a girl of 8 years suffering from the malformation known as "palmated ham,"—that is to say, the integuments formed, to the rear of the ham, a membrane extending from the nates to the heels, and becoming gradually narrower toward its free edge. This malformation existed on both sides, but was more pronounced to the left. Three other malformations existed in the same child: 1. There were but four toes on the right foot and the second of them had two rudimentary nails. 2. The labia majora were missing from the vulva, and the labia minora were rudimentary. 3. The upper maxillary bone showed a trace of harelip; the bony part of the palate was incomplete, and the uvula was bifid.

Nassi³¹_{June, '95} showed before the Medical Society of Berlin a family, comprising the father and four children, in whom were to be found hereditary malformations of the gums and alveolar bor-

der of the maxillary bones. The malformation, which dates from three generations back, consists of a hard and tubercled thickening of the gum, which begins to manifest itself after birth and little by little increases. Irregularities and thickenings of the alveolar border likewise develop, but on account of the thickness of the gums it is difficult to obtain an exact idea of the shape of the bone. In any case the chief malformation consists in the thickening of the soft parts, and this is so great that it covers the teeth almost as far as the free border. The relations between this malformation and the first and second growth of teeth are not well known, but in some cases irregularity in the position of the teeth is to be found.

Martin ²⁰³_{July, '95} describes a pseudencephalic fœtus belonging to the nosencephalic genus of Geoffroy St. Hilaire. The greater part of the top of the cranium was missing; it appeared as if it had been removed by the same section which is employed in autopsies to lay open the skull and show the brain. By passing the finger along the osseous border which surrounded this vast opening it was felt that the frontal bones constituted a transverse lamina, hardly a centimetre in height and inclined backward above the superciliary ridges. The parietal bones were rudimentary, existing only under the form of two small laminæ of bone which to the rear were in connection with the upper border of the tabular portion of the occipital bone. The occipital bone was almost complete. The tabular portion of the occipital bone only appeared to be truncated at its angle. This portion (tabular portion) of the bone was manifestly free upon the basilar portion, to which it was connected by a transverse fibrocartilaginous band. Toward its middle the space corresponding to this species of hinge was wider and formed a depression into which the finger could be introduced so as to feel an osseous border.

Gade ⁹⁹⁶_{Aug., '94} observed a case of anencephalia with amyclia. Several other anomalies were present, such as double microphthalmia, union of the lips forming a projecting ridge, lordosis of the lumbar region with atrophy of several of the vertebræ, aplasia of the twelfth rib, sternal fissure, union of the kidneys into a single one situated on a level with the promontory, etc. The mother had previously given birth to two anencephalic fœtuses. Histological examination of the tissues situated at the base of the cranium revealed the complete absence of nervous elements. However, traces of the hypophysis were discovered. In the eyes the crystalline lens was missing, as well as the entire ciliary body and iris and the fibrous and vesicular layers of the retina. A coloboma of the retina and choroid was found in one of the eyes.

Blanc¹⁶⁵_{Mar. '96} publishes a long article on otocephalia and cyclopia, and gives many descriptions of the structure of otocephalic monstrosities, by the aid of which he establishes a morphological classification. The first general characteristic of such monstrosities is either the absence or a rudimentary state of the mandible, coinciding with a downward flexion of the lateral surfaces of the head. This general malformation of the head affects more particularly the sensory organs. The most constant of these secondary lesions are the occlusion of the bucco-nasal cavity in the rear, the closure of the isthmus of the fauces, and the embryonary position of the tongue; next may be placed the drawing near together of the middle ears and the fusion on the middle line of their two cavities; finally, a special form of cyclopia differing greatly from the form found in cyclocephalics properly said. In these latter cases the eyes draw together and unite, as it were, by sliding in the space separating the frontal, nasal, and intermaxillary bones from the upper maxillary bone, and the united eyes thus remain toward the upper part of the head, above the joined upper maxillary bones. On the other hand, in otocephalic subjects the eyes unite by passing below the skull, and the new orbit is found under the anterior sphenoid bone, the alæ of which are inclined downward on the sides.

Féré¹⁴_{May 1, '96} reported to the Société de Biologie some cases of experimental teratology. By submitting to teratogenous agents eggs which were being incubated he obtained many congenital anomalies of the limbs, such as the non-existence of nails, deformation of toes, and deviation of the feet, a talipes equino-varus being the one usually seen. This latter deformity is justly attributed to a compression by the amnios, due to an insufficient amount of liquor amnii. Féré thinks that outward deviation of the great toe (hallux valgus) must be attributed to the same cause.

Van der Stricht¹⁴_{Mar. 27, '96} presented to the Société de Biologie an article on the formation of the cœloma in the embryo. His conclusions were as follow: 1. The first appearance of the wall of the cœloma is represented by a lateral thickening of the mesoblasts, whose cells assume the characteristics of epithelium. This appears toward the same period as the medullary groove, on a level with the extreme lateral parts of the anterior extremity of the embryo. 2. The real cœlomic cavity is formed by a species of delamination in this sense: that several isolated slits appear, to begin with, uniting later on, to give rise to a more voluminous single slit. 3. The cœlomic cavity tends to extend anteriorly toward the extreme lateral parts of the embryonary area, while posteriorly it tends to draw near to the axial regions.

HISTOLOGY AND MICROSCOPICAL TECHNOLOGY.

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HISTOLOGY.

The Nervous System.

The Neurons.—The new theory of the neurons formed the subject of several interesting papers, the most important of which were those of Waldeyer and Flatau. As is well known, the neuron theory is based upon researches by Golgi, Ramón y Cajal, Kölliker, Retzius, His, Lenhossek, Van Gehuchten, Waldeyer, Schaefer, and others, the term “neuron” having been proposed by Waldeyer.

[Before these researches were made it was known that there existed in the central nervous system a net-work formed by the protoplasmic prolongations of the motor and sensory cells of the spinal cord. In 1880 Golgi demonstrated that the protoplasmic prolongations terminated freely and that the net-work was formed exclusively by the ramifications of the axis-cylinder. Later, while modifying the technique, Ramón y Cajal proved that the axis-cylinder, as well as the prolongations, had free terminations. Under these conditions the nerve-cell became an absolutely independent organism. The neuron consists of three portions: (1) the cellular body; (2) the protoplasmic ramifications, the protoplasmic tuft; (3) the ramifications of the axis-cylinder. In pursuing his studies, Ramón y Cajal demonstrated that the relations existing between the neurons and their ramifications were not those of continuity, but of simple contiguity, or contact. The ramifications of the axis-cylinder and of the protoplasm of a neuron do not continue with those of another neuron; they are simply placed in a temporary contact with each other. Thus, the nervous system consists merely of a chain of neurons.]

This new theory explains, fully as well as did the old, all the physiological phenomena of motility and reflex sensibility. In explanation of motion, a neuron, as the motor cell of the pyramid, places the terminal expansion of its axis-cylinder in connection with the protoplasmic prolongations of a motor cell of the spinal

cord, and, through the latter, the impulse is transmitted to the nervous ramifications of the muscles, causing contraction. Motion, according to this theory, is the result of the conduction of a nervous current through the agency of two neurons,—one situated at the beginning (archineuron) and the other at the end (teloneuron) of the process. The sensory phenomena are likewise transmitted by means of two neurons; only in this case the cell of the spinal cord is the archineuron and that of the cortical layer the teloneuron. In certain cases there may exist an intermediary neuron. The reflex acts may also be all explained by conduction from neuron to neuron. As for psychical phenomena, they probably result from the contact of a greater or a lesser number of protoplasmic cellular expansions. The body of the cell plays the most important part in the life of the neuron. When it has undergone alteration its prolongations degenerate. Death of the cell always precedes that of its prolongations.

In the last issue of the *ANNUAL* (vol. v, H-20) the fact that so eminent an histologist as Dogiel challenged the doctrine of strict anatomical independence of the neurons was noted. Morin, of Havre,¹⁴_{Mar. 6, '95} states that, in certain portions of the organism, anastomoses existing between the prolongations of the nerve-cells can very clearly be demonstrated. This is particularly the case with the nerve-cell of the membrane of Descemet. Reynaut, of Lyons,¹⁴_{Feb. 27, '95} in an elaborate article, counsels reserve in the acceptance of the neuron doctrine, especially when new theories regarding pathogenesis are to be elaborated.

Brain.—W. Lloyd Andriezen, of Wakefield,¹⁶_{July, '95} as the result of personal investigations by the Golgi-Cajal method modified by himself, proposes to classify the neuroglia elements of the human brain as follows: 1. Neuroglia fibre-cells. 2. Protoplasmic glia-cells. Between these two classes of cells there are well-marked distinctions. There are two species of neuroglia fibre-cell,—(a) that situate in the first layer of the cortex, the caudate cell; and (b) that situate in the medullary substance, the stellate fibre-cell. The caudate cells are imbedded in the outermost layer of the cortex, with their bases toward the pia mater. From the apex of each cell fibres stream, tuft-like, into the deepest layers of the cortex. From the base tangential fibres are given off. The individual fibres are long, smooth, contoured of uniform thickness, unbranched, and slightly wavy. In the stellate fibre-cell a distinct cell-body is hard to recognize; its characteristic is the enormous number of fibres it gives off. These closely resemble the fibres of the caudate cells. The protoplasmic glia-cells, in contradistinction to the neuroglia fibre-cells, occur abundantly throughout the

gray matter in all layers of the cortex, and are correspondingly rare in the medullary substance. These cells possess a distinct cell-body; their processes are of moderate length only, vary greatly in calibre, and are dendritic. Further, the protoplasmic glia-cells are attached to the perivascular sheaths by one or more processes. Andriezen gives reasons for believing that these cells, with their processes, are surrounded by lymph-spaces, which are continuous with the perivascular lymph-space. The neuroglia fibre-cells exhibit no such lymph-space. In addition to the distinctions already drawn between the two classes of cells, it can be shown that the protoplasmic glia-cells with vascular connection are mesoblastic in origin, whilst the neuroglia fibre-cells are epiblastic. The function of the latter seems to be to provide "a passive supporting felt-work" in the brain, whilst the protoplasmic glia-cells play "an active rôle in the circulatory and lymphatic economy of the brain." The cells last mentioned are really the elements which hypertrophy and fibrillate in pathological states, such as alcoholism and general paralysis. A further noteworthy point is, that the fibre-cells form a perivascular "felt-work" ensheathing the cerebral blood-vessels, constituting a "distinct and well-organized fourth coating." The cells are arranged mainly with the long axis parallel or transverse to that of the vessels. Being imbedded in the ground-substance, they have no continuity with the adventitial sheaths of the vessel which lies outside that substance. Besides the cells mentioned, the ordinary stellate glia-cells contribute a few fibres to the perivascular "felt-work." As to the physiological significance of the sheath, Andriezen points out that it opposes a considerable resistance to undue expansion of the blood-vessels, thus, in a measure, compensating for the weakness of the muscular coat and the absence of a tough adventitial coat in the cerebral blood-vessels. Further, its texture and porosity are such as to allow of the free passage of lymph and products of metabolism, thus permitting interchange between the cerebral tissue and the perivascular lymph-spaces.

J. Luys, of Paris, ¹⁰¹⁵_{Nov., '94} after a series of researches with regard to the disposal of the white fibres of the cerebral substances, concludes that the totality of the central white fibres may be reduced to three systems of fibrillary elements. The first is represented by a distinctly isolated category of the white fibres, which, on account of their direction, may be designated as the "system of commissural fibres." They are bilateral, and have a transverse direction. The second system, which may be termed, on account of its connection, the "system of cortico-thalamic fibres." The third, a system of cerebral white fibres, which is, in turn, composed

of a series of white fibres having their common origin with the preceding, in the midst of the various gray regions of the cortex, before becoming dispersed in the mass of the striated body and that of the suboptical nuclei. Owing to these connections this special system of white fibres may justly be called the "system of cortico-striated fibres." The physiological rôle of each of these systems of white fibres can be outlined as follows: It may be said that the transverse, or commissural, fibres may be regarded as serving for the unity of action of the homologous regions of each of the two cerebral lobes. The cortico-thalamic may be considered as the diffusion-courses, in a centrifugal direction, of the various orders of sensorial incitations irradiated from the gray thalamic nuclei toward the different regions of the cortex (sensory fibres analogous to the posterior roots of the spinal cord). The cortico-striated fibres, on the contrary, can be considered as destined to lead toward the central motor regions (the striated body) the incitations, of centripetal direction, conceived in the various psychomotor territories of the cortex. These two systems thus complete one another and constitute a sensory-motor pair (fibres analogous to the anterior roots of the spinal cord). As to the group of sub-thalamic fibres, its physiological rôle is still as little known as that of the central nuclei in which the fibres are distributed.

J. Dejerine studied ¹⁴_{Apr. 3, '90} the connections of the red nucleus with the cerebral cortex, and the following problems in particular: Is there a direct connection existing between the superior cerebellar peduncle and the cerebral cortex? Does the red nucleus enter into connection with the cerebral cortex? Is this connection with the cerebral cortex direct, or does it occur through the intermediary of the nuclei of the optic layer? The superior cerebellar peduncle does not receive direct fibres from the cerebral cortex. The red nucleus becomes atrophied consequent upon lesions of the superior cerebellar peduncle. On the contrary, when the lesion only involves the cerebellar cortex and the subjacent white mass, as, for example, in cases of primary sclerosis of the cerebellar cortex, with obliteration of Purkinje's cells, the superior cerebellar peduncle and the red nucleus remain intact, as already stated by Mengel and Arndt. These facts thus demonstrate that the superior cerebellar peduncle (Forel, Mahaim) has its origin in the red nucleus, and that it only enters into indirect connection with the cerebellar cortex. The experimental researches show, besides, that it intercrosses itself incompletely, and that it contains a direct fascicle which detaches itself from the superior cerebellar peduncle before its intercrossing and extends into the thalamus of the same side. Atrophy of the red nucleus consequent upon cortical lesions has

been reported in several cases, including a personal one. These cases show (1) that there exist indirect connections between the cortex and the red nucleus through the intermediary of the optic body; (2) that there are also direct connections between the cortex and the red nucleus through the direct cortico-rubric fibres.

The results of the author's researches are that the cerebro-cerebellar tract which passes through the red nucleus and the dentated body of the cerebellum is—contrary to the opinions of Meynert, Flechsig, and Hosel—not a direct, but an indirect tract composed of at least three neurons: an upper cerebral or cortico-rubric neuron, constituted by the radiations of the red nucleus; a middle or rubro-cerebellar neuron, constituted by the superior cerebellar peduncle, and a lower or cerebellar neuron, represented by the fibres which unite the cerebellar olive to the cerebellar cortex. Alongside of the direct cortico-rubric tract there exists another indirect tract, which passes through the optic layer, and of which the first neuron is formed by the thalamic radiations which unite the cerebral cortex to the nuclei of the optic layer, and the second by the radiations of the tegmentum uniting the thalamus and the red nucleus.

The cortical region in which the primary cells of the direct cortico-rubric neuron are located has not yet been fully determined; it is probable, however, that it occupies a considerable space and that it is mainly situated in the cortex of the parietal lobe. Dejerine found that in the adult the direct cortico-rubric fibres degenerate, consequent upon lesions of the angular gyrus of the lower parietal lobe and of the gyrus inframarginalis; but, in these cases, the degeneration was much less pronounced than in the case of the extensive cortical lesion reported by him.

Ramón y Cajal, of Madrid, ¹⁰⁰⁶_{Mar., '95} by means of the method of Golgi and Weigert, applied to the dog, the cat, the guinea-pig, the mouse, and the white rat, arrived at the following conclusions concerning the pons Varolii: 1. The pons is the site of origin for the greater part of the fibres constituting the middle cerebellar peduncles; these fibres penetrate the white substance of the cerebellum and then go into the cortex of the cerebellar lamellæ, where they constitute, perhaps, the ascending fibres. 2. The medulla is also formed by axis-cylinders from the cells of Purkinje, which, after having crossed the median line and taken a more or less vertical course, direct some longitudinal fibres into the reticular substance of the opposite side. 3. These facts, together with the existence of collaterals in the medulla from the pyramidal tract, throw some light upon the influence of the cerebrum upon the cerebellum. Suppose, for example, that the cerebrum sends along

the pyramidal tract a voluntary motor impulse to the muscles. This impulse, having reached the level of the medulla, will pass, in part, through the pyramidal collaterals and the fibres of bulbar origin up to the cerebellum. There it will excite the cells of Purkinje and those subordinate to them to add to the motor impulse a co-ordinating nervous current, which will reach the motor niduli of the medulla and cord, perhaps by way of the second variety of bulbar fibres, perhaps by the restiform body, or perhaps by the descending cerebellar fibres of Marchi of the antero-lateral columns. The conclusion drawn is that the cerebellum receives information of every voluntary motor impulse, and its co-operation is necessary for the precise execution and co-ordination of movements. 4. The pyramidal tract is in connection, by means of its collaterals, with different gray centres of the encephalon and cord; for example, with the cells of the striata through the collaterals of the small fibres of the internal capsule; with the substantia nigra of Soemmering through other collaterals from the superior part of the peduncles; with the cells of the pons and, consequently, with the cortex of the cerebellum through the bulbar collaterals; and, finally, with all the motor niduli of the medulla and spinal cord.

In a series of researches upon the structure of the red nucleus and its connections with the superior cerebellar peduncle, A. Mahaim, of Liège, ⁵²_{v.13} found that there exists, in the red nucleus of rodents, at the junction of the anterior and middle thirds, a small, spherical nucleus, composed of ganglionic elements of very small dimensions, which he designates, owing to its very limited extent, *nucleus minimus*. This small nucleus has no connection with the superior cerebellar peduncle of the opposite side, differing, in this respect, from that portion of the red nucleus at whose limit it is found. In the red nucleus three portions are to be distinguished: (a) The anterior portion, the smallest, has no connection with the superior crossed cerebellar peduncle. The same is the case with several cells, very limited in number, which are scattered about in the two other portions of the red nucleus. This anterior region, as well as these few elements, form the origin of the straight bundle of the upper cerebellar peduncle, and send forth their axis-cylinders to the cerebellar hemisphere of the same side. (b) The middle portion, the largest, is composed, in the majority of rodents, of ganglionic elements of small and medium dimensions. These cells form the origin of a large portion of the superior cerebellar peduncle of the opposite side; but their axis-cylinders abandon, in the reticular formation, numerous collaterals, which thus bring the cellules of the middle region of the red

nucleus into close relation with this formation. (c) The posterior portion of the red nucleus consists principally of cellular elements of large dimensions. These cells all send forth their cylinder-axes into the superior cerebellar peduncle of the opposite side. His experiments fully confirm the result published upon this point by Forel, in 1881.

Unilateral section of the superior cerebellar peduncle enables Mahaim to affirm that this peduncle is composed of a bundle which does not extend beyond the median. Marchi had previously recognized the existence of this fascicle after the extirpation of a cerebellar hemisphere; it represents only a small portion of the superior cerebellar peduncle. The largest portion of the latter crosses the median immediately behind the red nucleus and terminates in the cerebellum. Unilateral section of the cerebellar peduncle determines a diffuse atrophy of the entire cerebellar hemisphere on the side opposite to the red nucleus from which, as stated by Forel, the severed peduncle arises. This atrophy appears to him to affect the dentated nucleus equally with the cerebellar hemisphere. The cerebellar hemisphere and the dentated body of the cerebellum are thus in connection with the superior cerebellar peduncle. But, contrary to the opinion of many authors (Bechterew, Marchi, and others), he does not regard these portions as forming the origin of the superior cerebellar peduncle. *This peduncle has its origin in the red nucleus and terminates in the dentated body of the cerebellar hemisphere.*

Spinal Cord.—Recent anatomo-histological researches of the central nervous system having demonstrated the absence of anastomoses between the nerve-elements, the important question arises as to the conductivity of the protoplasmic or dendritic prolongations. The absence of any physiological reaction whatever after excitation of the central end of the anterior roots shows that the dendrites only conduct in a direction toward the cell. To elucidate this question, Alislawski, of Kazan, ³¹_{Apr. 16, '94} undertook a series of galvanometric experiments upon frogs, using Thomson's static galvanometer. The current of the spinal cord (longitudinal and transverse sections) was directed to the galvanometer with the aid of Fleischl's non-polarizable electrodes; the sciatic nerve was excited by the inductive current. When the posterior roots were intact, each excitation of the nerve was accompanied by the negative oscillation of the current proper to the spinal cord; the posterior roots being cut, this negative oscillation was no longer noticed. The experiments prove, in conformity with the results obtained by Gotch and Horsley, that the excitation having reached to the nerve-cell is not transmitted by the dendrites to the other

elements. When the posterior roots of the sciatic nerve of the one side are placed in communication with the galvanometer, at the same time the sciatic on the other side is also excited; the negative oscillation is only observed in animals in which the corresponding posterior roots are intact. These experiments seem to show the impossibility of transmitting the excitation of a nerve-cell and of its dendrites to the collaterals and other nerve-cells.

Paladino⁴⁸⁴_{v.19, No.2} states that his method of staining by iodide of palladium, after the removal of the medullary substance, brings out simultaneously the nerve-cells and the neuroglia elements. Amongst other points it shows that the medullated sheath of nerves is formed on a frame-work or skeleton of neuroglia tissue directly continuous with the interstitial neuroglia. This intramedullary neuroglia also has its cells, irregular in outline. The neuroglia net-work about the nerve-cells is well shown by this method: on the one hand, it is continuous with the interstitial neuroglia; on the other, delicate fibres can be seen to pass on to the nerve-cells. Further, the method shows the continuation of the neuroglia fibres into the pia mater.

Brissaud¹⁰⁹⁰_{Oct.15,'94}¹⁶_{July,'95} is of the opinion that all the cells of the neuroglia are essentially epithelial in their nature. The cylindrical cells of the ependyma of the spinal canal are merely a variety of the cells of the neuroglia, and terminate, at their basal extremity, in numerous processes similar to those of the so-called spider-cells. In cases in which the central canal is filled with epithelium, several more or less regular openings may sometimes be found in a transverse section, similar to those occurring in glandular epitheliomata, and the deep elements of the neuroglia beneath the epithelium of the central canal, even when the latter is normal, not infrequently group themselves about a cylindrical opening. These facts the author thinks suggestive as to the mode of formation of cavities in syringomyelia.

According to Dejerine and Sottas, of Paris,¹⁴_{June 19,'95} the column of Goll, as soon as it is formed, no longer receives, in its upward course, either new fibres from the outside or endogenous fibres. In three cases of transverse lesions of the spinal cord they were able to follow the degenerated fibres, and in one of them, where the lesion was very severe, no healthy fibre remained from the third dorsal to the neck of the bulb.

Carousine, of Moscow,³¹_{Apr.16,'94} after a series of embryological investigations concerning the bundles of the spinal cord, concludes that the embryological method is capable of rendering only limited service with regard to the separation of the different fascicular systems of the spinal cord. The scope of the embryological

method is, according to the results of his researches, much exaggerated by certain authors. In the first place, no invariable relation exists between the size of the embryo and the development of its central nervous system. The development of the bundles of different portions of the white substance of the cord usually takes place in periods anterior to those actually admitted in science; this development begins in the depths of the corresponding columns, and is propagated toward their periphery. The only exception to this general rule is in the case of the pyramidal fascicles and the zone of Lissauer, which, relatively, develop much later than the other systems of the spinal cord, most probably on account of their especial functional significance.

F. W. Mott² July 28, '94 contributed a preliminary report upon an experimental investigation into the afferent tracts of the central nervous system of monkeys. The following facts seemed to be established: The antero-lateral tract of the spinal cord is a mixed tract of ascending and descending fibres. The ascending, for the most part, cross in the anterior commissure. The majority of these fibres go to the middle lobe of the cerebellum, but some, as stated by Erlinger, pass into the *formatio reticularis* and lateral fillet, and can be traced to the *corpora quadrigemina*, and even into the optic thalamus. In one case of unilateral section of a large number of roots of the cauda equina a symmetrical degeneration in the antero-lateral columns of both sides of the spinal cord was observed. These degenerated fibres could be traced as high as the *corpora quadrigemina*. Mott believes the degeneration is not accidental, but the result of the lesion.

Sympathetic System.—A. von Kölliker published⁸ Nos. 40, 41, '94 a very good review of the facts known concerning the finer structure of the sympathetic system. Our knowledge relative to this subject has been considerably extended and modified during the past few years. Thus, the sympathetic cell of the batrachians—characterized, as we know, by the presence of a straight prolongation besides another twisted into a spiral—is now, nevertheless, looked upon as a unipolar cell; the straight prolongation is alone accepted as originating in the cell, and the spiral prolongation, on the contrary, merely envelops the sympathetic cell by a terminal trellis of nerve-fibrils, representing the pericellular termination of a nerve-fibre having its origin elsewhere, in some other central region. The centrifugal impulse starting from a centre might, in this way, influence the sympathetic nerve-cell, which would, in turn, transmit the irritation to the straight fibre detached therefrom, and which provides for the innervation of smooth muscular cells. In the mammals the sympathetic cell is, as is well known,

of different structure. Thanks to recent researches we have been able to recognize therein, as in the cells of the cerebro-spinal nervous system, two kinds of prolongations,—protoplasmic and nervous; the first probably conduct the impressions toward the cell, while the second transmit them in a centrifugal direction with regard to the cell considered as the centre. As for the fibres of the sympathetic nervous system, they, for the most part, originate in the sympathetic cells and are surrounded by a sheath of myelin, but there are amedullar fibres also. Others merely cross the sympathetic system, extending from the viscera toward the cerebro-spinal axis, or starting from the latter and terminating in the sympathetic nervous system. The first are of a sensory nature; they transmit to the cerebro-spinal system the more or less vague or unconscious sensations of which the viscera form the seat; they may terminate in special nerve-corpuscles,—for example, the corpuscles of Pacini in the mesentery of the cat. The second transmit motor impulses starting from the cerebro-rachidian axis to the ganglia of the sympathetic nerve; the terminal arborizations of these fibres merely affect relations of contiguity with the sympathetic cells. No facts, up to the present time, plead in favor of the existence of direct, uninterrupted connections between the encephalo-rachidian axis and the smooth muscular system; thus, the fibres of the motor oculi undergo an interruption in the ophthalmic ganglia which is sympathetic in nature; in like manner the fibres of cerebro-spinal origin, which preside over the contractions of the erector muscles of the fur of the cat, are subject to an interruption in the ganglia of the chain of the great sympathetic. The motor fibres emanating from the sympathetic cells sometimes end directly in the smooth muscles; this occurs, for instance, in the fibres emanating from the sympathetic ganglia situated in the viscera or in their immediate vicinity (ganglia in the coats of the intestines, in the lungs, submaxillary ganglion, etc.); sometimes, again, they terminate in other sympathetic ganglia, more or less distant, to which they transmit the motor impulse. Can the sympathetic nervous system form the seat of true reflex actions? This is probable, but has not yet been irrefutably proven. The subject is also reviewed by Byron Robinson, of Chicago. ⁸⁵⁵
Oct., '94

Arterio-Venous System.

Heart.—In a series of researches on the nerves of the heart in the frog and in mammals, Paul Jacques ¹⁶⁵
Nov., Dec., '94 invariably found, instead of the superior cardiac nerve of the pneumogastric, classically described as a distinct and independent filament, a certain

number of very fine branches, detached from the vagus at various points, and immediately projecting themselves against the carotid and descending, closely applied to the latter as far as the arch of the aorta. On the other hand, the cardiac nerves of the sympathetic do not always present the topography of the classical descriptions, according to which they occupy in the thorax a different position on the right, where they pass behind the arch of the aorta, from that occupied on the left, where they pass before the latter; in reality, the author found that on the left, as on the right, side the greater number of these sympathetic cardiac nerves are posterior to the arch, only a very few filaments crossing its anterior surface. It is, furthermore, thought that the filaments issuing from the coronary plexuses share the course and the distribution of the arteries, only abandoning the latter to penetrate into the muscles. Now, by the injection of methylene-blue the nerves can clearly be seen against the brownish-green background of the muscle; the nerve-filaments, while disengaging themselves from the cellulo-adipose tissue of the auriculo-ventricular grooves, extend to the surface of the myocardium, following a rectilinear course completely independent from the course of the vessels, as well as from the direction of the superficial muscular fibres. By the emission of numerous anastomotic branches these nerves unite in one vast plexus, situated immediately below the pericardium, more superficially than the vascular ramifications and totally independent of them. From this subpericardial plexus arises, besides the muscular branches, a net-work destined for the serous membrane, and of which the most superficial elements are subendothelial. This relates particularly to the heart of mammals. To the subpericardiac plexus are annexed numerous small ganglia, principally at the level of the interauricular and auriculo-ventricular grooves, as well as to a variable extent on the surface of the auricles and ventricles, sometimes reaching their upper half. The cells of which they are composed are not closely set one against the other and enveloped in a single sheath, but have quite large interstices intervening.

The nerve-branches which penetrate into the myocardium are prolonged to just below the endocardium, where they form a rich plexus, comparable to the subpericardial plexus, and likewise giving rise to nerve-fibres for the cardiac muscle and a net-work destined for the inner layer of the heart. Purkinje's fibres are enveloped in an interlacing of nerves with small meshes emanating from this subendocardiac plexus. The cardiac valves inclose nerves which are numerous in the auriculo-ventricular valves and more rare in the arterial valves.

The nerves of the ventricular myocardium issuing from the coronary plexuses repair to their respective regions by a triple path leading through the intermediation of the subpericardial and sub-endocardial plexuses for those destined for the external and internal fibres and directly for those of the middle muscular layer. The smaller nerve-trunks anastomose after their entrance into the myocardium and form a fundamental myocardiac plexus, from which starts the system of intra-muscular fibres. From these latter originate the terminal fibrils, which penetrate among the cells of the muscular bundles, with which they enter into communication through the intermediary of lateral and terminal buds of varying form and volume, for the most part comparable to the terminations described in the striated muscles of various invertebrates. The majority of these buds or nodules are fusiform; some resemble a mushroom, and the nerve-fibril is then inserted on their plane surface. It is, moreover, not unusual to meet with decidedly varicose fibrils, which, after having become progressively thinned by successive dichotomic divisions, terminate freely in small, olive-shaped buttons between the elements of the myocardium, which arrangement resembles the type of the sensory terminations.

There exist, in mammals and in the frog, in the thickness of the cardiac muscle, star-like connective-tissue cells, colored black by chromate of silver, and which may easily be mistaken for nerve-elements. These elements, already described by Fusari and interpreted by him as being cellular tissue-cells, are probably those regarded by Berkley as terminal apparatuses of complex form. At all events, no cells are found in the interior of the cardiac muscles comparable, either as regards size, shape, or arrangement, to the ganglionic elements of the surface, and, consequently, capable of being, with certainty, accepted as intra-muscular nerve-cells.

Arteries.—Heger and de Boeck, of Brussels, ⁶⁸⁵_{Sept., '95} reached the following conclusions, after a series of researches upon the structure of the cerebral arteries: 1. Certain special anatomical and characteristic arrangements exist in the vascular net-works, which give them a certain autonomy. Often, and more particularly in those organs having an intermittent function, the method of ramification of the arteries is such that many ways are offered for the passage of the blood arriving through the artery. The resistance offered to the passage of the blood by these different paths varies according to the degree of contraction or patency of the vessels, while the distribution of the blood in the various portions of the organism is subject to corresponding variations. 2. The anatomical arrangement we have just cited is especially manifest in the brain; the cerebral arteries do not furnish any distinct cortical

branches, and the circulation in the cortex, in consequence, always depends upon the circulation in the mesocephalon. 3. The structure and the mode of distribution of the cerebral arteries consequently insure a continuous and regular cortical circulation as long as the carotid pressure is sufficient and the vascular tonus is maintained. This is the case during the waking hours, or a condition of intellectual activity. During sleep, on the contrary, cortical ischæmia exists, owing to the diminished blood-pressure and the dilatation of arteries throughout the vascular system. 4. No sphincters or special histological arrangements exist in the musculature of the cerebral arteries; the special forms of the encephalic circulation and the peculiarities in its function are due, above all, to the arrangement of the cerebral vessels,—i.e., in superposed loops that do not anastomose one with the other.

Veins.—L. Ranvier ⁹²⁰_{Jan. 7, '96} concludes that the veins are furnished with vasomotor nerves as well as the arteries. When, in the rabbit, a transverse pressure is exerted with the nail upon the auricular artery, thus forcing it against the cartilage of the ear, the artery will be seen to dilate; this dilatation is due to the paralysis of the numerous nerve-fascicles in its immediate vicinity, which have become affected by mechanical action. The artery resists, but the more fragile nerves are severed. Again, if, after having thus occasioned the auricular dilatation, the external marginal vein is compressed in the same way, by means of the nail, this, in its turn, becomes dilated, and, on the other hand, this compression of the marginal vein suffices to cause its dilatation without its being necessary to previously paralyze the median artery. This dilatation of the veins beyond the compressed region is associated with the mechanical destruction of the nerve-filaments accompanying them, which preside over the innervation of their muscular elements.

Muscular System.

Retzius, and afterward Melland, Van Gehuchten, Marshal, and Ramón y Cajal, showed, with chloride of gold, the existence of longitudinal filaments in the striated muscular fibre, united transversely, at the level of the striæ of Amici, by a fine net-work of transverse fibrils. These filaments are the only real contractile elements, the transverse net-work being of an elastic nature and the contents of the sarcolemma myoenchyme. The isolable primitive fibrils of Kölliker are an artificial product, and the succession of varying refractive discs mere optical effects. By the aid of Golgi's method, R. Fusari ⁴⁰⁹_{v. 27, p. 89} again found these longitudinal fibres, and he states that, in the plane of the striæ of Amici, there exists a

fine net-work, formed of filaments and nodulous points of various sizes. At each extremity of the birefractive disc there is another transverse net-work of filaments and nodule-points. Within the birefractive disc other elongated corpuscles, of a reddish-brown color, are found. In the muscular fibres in course of development the longitudinal filaments are larger and more apparent. Fibres fixed in the state of contraction show the transverse net-works of the striæ of Amici closer together than fibres in repose.

In an exhaustive study of the striated muscles in various groups of fishes, amphibians, reptiles, birds, and mammals, F. Maurer^{381 90}
Sept., '94; Apr., '95 found that the muscular rudiment of each segment of the body, which is at first composed of epithelial cells, becomes converted into a multinucleated protoplasmic mass; subsequently this mass is divided by a series of longitudinal folds, which pass from within outward, into a number of flat, nucleated, longitudinal bands, and the peripheral protoplasm of each muscle-band develops a number of longitudinal, transversely striated fibrils. The interstices between the muscle-bands become occupied by connective-tissue elements, which unite to form lamellar septa. At a later period the fibrillation extends throughout the whole of each muscle-band, and the striated protoplasm is cleft into numerous longitudinal bundles; the outermost of these bundles become surrounded by connective-tissue septa, which pass between them from the lamellar septa between the muscle-bands. This comparatively primitive condition remains permanent in lampreys, but in the hag-fish and the sturgeon the connective-tissue septa extend farther into the interior of the muscle-bands and surround each of the longitudinal divisions into which the protoplasmic mass becomes cleft; in higher forms each of the longitudinal bundles becomes farther cleft into small portions. Each primitive muscular band develops around itself a structureless membrane, the sarcolemma, and each longitudinal bundle into which a muscular band is cleft develops a similar structureless sheath; therefore the sarcolemma is a cuticula. There are two sets of muscle-nuclei,—the peripheral and central; both remain in the lower forms, but in the higher animals the central nuclei disappear and the peripheral remain as the sarcolemma nuclei. Other modes of formation of muscle-fibres—*i.e.*, formation by outgrowth from a cell or by the transformation of closely-associated spindle-formed cells—must be looked upon as cœnogenetic modifications of the typical developmental process.

H. Boheman³¹⁶
v. 10, No. 10 confirms the existence of anastomoses between the smooth muscular fibres,—a fact already proven by a number of observers, after a study of the muscular supply of the stomach and the intestines in the cat, dog, pig, and rabbit. By

Golgi's method and by interstitial injections of bitumen in solution in chloroform or in ink, the interfibrillary canaliculi, true juice-canals, are shown, and it becomes evident that no cement fills the free spaces between the fibres.

Lymphatic System.

Dobrowolski ⁷⁶⁸_{v.16,p.43} has carefully studied sections of mucous membrane of the œsophagus, stomach, respiratory tract, and vagina, in order to ascertain the relative supply of lymphatic follicles. He detached pieces of from one to two square centimetres from the various points, which, after hardening, he divided into complete series of sections. The œsophagus, he found, seldom contained lymphatic follicles; in 6 dogs and 5 cats they were entirely absent in the œsophagus, in 3 animals there were very few, and in 2 they were extremely numerous, the follicles here being most numerous above and in front, and rare in the inferior and posterior portions of the duct.

In the stomach a small number of closed follicles were found in the vicinity of the pylorus and the cardia, where they were most numerous even when absent elsewhere. They were always located in the mucous membrane above the muscular layer; generally lenticular in form; they separate the deeper extremity of the glandular tubes, being from 0.3 to 1 millimetre in size. In all the varieties of animals studied they were provided with a central germinative fissure.

As to the respiratory tracts the author finds that the pyriform sinus sometimes does not contain any follicles, but merely an infiltration of cells not forming nuclei, while sometimes there exists a nodular accumulation analogous to the follicles of the tonsils. At times the adenoid tissue constitutes follicles, as in the larynx, and finally they may be met with in the form of groups. In the healthy larynx the lymphatic follicles are rare and only occur in certain localities (Morgagni's ventricle; more rarely, the inter-arytenoid space, inferior portion of the posterior surface of the epiglottis); they multiply in certain catarrhal affections of the larynx,—*i.e.*, follicular laryngitis.

In three healthy human vaginæ the adenoid tissue extended in a uniform layer below the epidermis and in the papillæ, here and there—though not invariably—forming little nodular accumulations. In one instance there was a great number of small nodules. In cats and dogs the vagina contains a greater number of lymphatic nodules, which are also much larger than in women.

Regaud ¹⁶⁵_{Dec., '94} ¹²⁶_{Apr. 15, '95} confirms the views of Langhans and Coyne to the effect that lymphatic vessels do not penetrate into the lobules

of the mammary gland and that they do not come into direct contact with the glandular secretory elements. At the present time two opinions exist relative to the lymphatics of the breast. According to some (Waldeyer, Kolessnikow, Creighton, Sorgius) they take their origin in the periacinous spaces in the interior of the lobule, in intimate contact with the secretory elements; others consider (Langhans, Coyne) that they do not penetrate into the lobule and do not enter into other than mediate relations with the acini. The latter opinion is confirmed by recent researches.

The author made use of interstitial injections of a fixative preparation of silver (saturated solution of picric acid mixed with osmic acid and nitrate of silver). He studied the cutaneous lymphatics of the areola and of the nipple, those of the large milk-ducts, and those of the gland itself, properly speaking. Nothing important was observed in the cutaneous lymphatics. Those of the galactophorous ducts are voluminous, in a general direction parallel to that of the ducts, and are furnished with transverse anastomoses. They do not come into contact with the fine vitreous of the tubes and are mere connecting vessels between the cutaneous and the glandular lymphatics. An injection into the nipple effectively fills the lobular lymphatic net-work at a considerable distance away, and this fact explains the development of abscesses of the breast after cutaneous infections where there are fissures in the nipple.

The lymphatic system of the gland, properly speaking, is extra-lobular; it is disposed in interlobular connective-tissue tracts in the form of spaces or sacs and of canals which are covered with large and very thin endothelial cells, united by their edges. Neither the sacs nor canals ever penetrate into the lobule. At the most, an occasional thin lymphatic loop is met with, accompanying the galactophorous ducts into the hilum of the lobule, but it immediately extends outside again, forming a curve astride the bifurcation of the excretory canal. This apparent exception confirms the rule, for it proves that the injection can penetrate into the lobule; and that, if it does not mark any lymphatics around the acini, it is because there are none.

Digestive System.

Pancreas.—The finer structure of the pancreas can generally only be studied in animals, owing to the difficulty in obtaining perfectly fresh human specimens. For this reason the centro-acinous cells and the radiated canaliculi described by Langerhaus in the rabbit, and found in various animals by other histologists, have not yet been properly studied in man.

Laguesse, ¹⁴_{Oct. 31, '94} continuing the researches reported in the two last issues of the ANNUAL (1894 series, vol. v, J-22; 1895 series, vol. v, H-14), was able to obtain sections from three pancreases of executed prisoners twenty to forty minutes after death, and saw that the centro-acinous cells and the radiated canaliculi exist in man, and that they present certain characteristics. The centro-acinous cells are very numerous and completely fill the cavity of the secretory acini; instead of being fusiform, as in animals, they are stellated, and the branches of the star insinuate themselves between the large secretory cells forming the wall of the acinus. As to the radiated canaliculi, instead of completely separating these parietal cells, as is the case in animals, they terminate in blind pouches before reaching the base of these cells, and only exist at the level of their granular portion. Laguesse also observed in the pancreas of man the little organs described by Renaut as "lymphoidic" follicles, which, in his opinion, should, however, be designated as pseudo-follicles, as he has found, in studying them in the embryos of sheep, that all the intermediary forms between them and the secretory acini are represented. At all events it may be assumed that these acini, which are in repose as far as the secretion of the pancreatic juice is concerned, have an important rôle, on the contrary, in the internal secretion. He considers them as the secretory organs of the glycolytic substance.

Intestines.—A study of the genesis of the intestinal epithelium led Etienne de Rouville ¹⁴_{Jan. 16, '95} to confirm the views of Sabatier to the effect that: 1. The connective tissue continues, more or less, during life, to be the matrix from which originate the elements of the other tissues. It is a post-embryonic blastoderm. 2. The epithelia are merely, at least in many cases, the limiting elements of the free surfaces of the connective tissue.

Female Genital System.

Ovaries.—After an exhaustive study of the ovary, F. Foerster, of New York, ¹³²_{May, '94} formulated the following conclusions: 1. Small cysts are of common occurrence, not only in human ovaries, but also in those of the sow, ewe, and the cow. 2. The small cysts are original Graafian follicles, as shown by the researches of Nagel. 3. In a process not exactly pathological the stratified epithelial lining of the Graafian follicle undergoes peculiar changes leading to its disappearance. 4. The epithelium first breaks up into an indifferent or medullary tissue, and from this arises myxomatous vascularized connective tissue. 5. The type of the newly-formed myxomatous tissue varies in different animals. It may be medullary myxomatous, or myxomatous lymph-tissue, or fully-developed

myxomatous tissue with a well-marked basis-substance. 6. The newly-formed myxomatous tissue is always scantily supplied with blood-vessels, which probably grow into it from without.

The same writer ²⁷_{June, '95} also studied the development of the Graafian follicle after birth and sums up the results in the following *résumé*: The cortex of the ovary of the higher vertebrates is, at the time of birth, crowded with primordial ova consisting of nothing else but the vesicula and macula germinativa, and around the vesicula a thin layer of flat epithelia. The same he found to be the case in the ovary of a girl 5 years old. Among the primordial ova we find small clusters of epithelia, comparatively numerous in the cat and scanty in the human ovary. These clusters he considers as the direct product of Pflüger's ducts and as the ante-stage of the primordial ova. Hence, in contradistinction to the majority of histologists, he considers the primordial ovum as the product of numerous epithelia fused together, and not as the product of a single epithelium. Evidently the result of the fusion of the epithelia is an indifferent mass of protoplasm in which a differentiation into the ovum with the vesicula germinativa and a lining layer of flat epithelia takes place. The lining epithelia do not themselves grow up into cuboidal and columnar forms, but a fusion of such epithelia takes place, with the result of the appearance of multinuclear protoplasmic masses. These protoplasmic bodies split up into new and perfect epithelia, cement-substance intervening between the single epithelia. The living matter of the epithelia remains interconnected by the delicate thorns traversing the cement-substance. Furthermore, from either the cuboidal or columnar epithelia lining the follicle and the ovum an outgrowth of indifferent protoplasm takes place, with the final result of a production of multiple layers of cuboidal epithelia. By the liquefaction of a number of cuboidal epithelia, spaces arise filled with the albuminous liquor folliculi; remaining epithelial tracts keep the ovum *in situ*. The so-called structureless membrane ensheathing the follicle is not a constant formation; it is not structureless, but is derived from an infiltration of a layer of endothelia subjacent to the outer row of columnar epithelia of the follicle, with an extremely dense, so-called elastic basis-substance.

Hoelzl ²⁰_{v.134, No.3} studied the ovaries of sixty subjects of from 1 to 71 years old, and concluded that the Graafian vesicles present the same evolutionary phases in children and persons having passed the age of puberty. The difference in evolution consists in the following fact: in children the Graafian vesicles grow until they reach a point more or less near maturation, but they undergo regression before they rupture. From the time of puberty the

vesicles empty their contents after dehiscence, and are transformed into corpora lutei. When the contents of the vesicle degenerate the tissue of the capsule will be seen to proliferate and to replace the elements having disappeared. The dehiscence of a vesicle resembles the rupture of an abscess; a number of round cells (migratory?), forming the internal layer of the capsule, are seen to accumulate between the basilar membrane of the granular and the external layer of the follicular capsule. The increasing pressure occasioned by this cellular accumulation pushes the contents of the Graafian vesicle toward the superficial surface,—that is to say, toward the point offering the least resistance. In this way the ovule is transported outside in woman at puberty, probably in consequence of the periodical congestion occurring at the period of menstruation. In the child mere efforts of expulsion are observed in the form of the production of a thin, cellular layer upon the internal surface of the follicular capsule. Ovulation follows, more or less closely, the menstrual hypertrophy. The same cellular elements, having pushed the ovule outward, continue to proliferate and to fill the void caused by the dehiscence of the vesicle. In this manner the cavity of the latter is filled up with non-vascular tissue, which, owing to the absence of nourishing vessels, degenerates and becomes fatty (*corpus luteum*). Then it will be seen that the capsule (external layer), in turn, begins to proliferate and to furnish the tissue to replace the loss of substance. The *corpus luteum* of pregnancy and that of menstruation are identical formations, if we except the fact that the persistent congestion of the genital organs augments the dimensions of the *corpus luteum* of pregnancy and causes it to exist during a longer period. The repair of tissue which takes place at the point of rupture does not take place by a cicatricial process; in reality, the ovary is regenerated at this point by a tissue which retains its cellular elements, instead of being replaced by a non-modular tissue.

According to L. F. Henneguy,¹²⁶_{July 15, '94} the atrophy of the Graafian follicles, after the latter reach the various stages of their development, is a normal phenomenon. Regarding the ovule of these follicles only one mode of regression—that of fatty degeneration—has been recognized. The researches of the author led him to study a special mode of regression, in which the vitellus divides itself into a certain number of masses resembling the morula of true segmentation. This is a degeneration by fragmentation, which may be regarded as a beginning of parthenogenetic development. The ovule reaches a state of maturity, marked by the transformation of the germinative vesicle into a direction, and generally by the production of a polar globule. The impulse transmitted to

the protoplasm by the division of the nucleus persists during a certain time and occasions the division of the protoplasm; but, the regulating action exercised by the nucleus being absent, this division takes place in an irregular manner, and the normal segmentation is replaced by a disordered fragmentation. The vitellus is thus divided into unequal masses, some of which contain one or more karyokinetic figures, which are missing in others. Inversely to that which takes place in the normal segmentation, a dissociation between the division of the nucleus and that of the vitellus occurs during the parthenogenetic fragmentation of the ovule. Moreover, different degenerative processes may be met with in one and the same ovule: chromatolytic and fatty degeneration; chromatolytic and hyaline degeneration; chromatolytic degeneration and fragmentation; fatty degeneration and fragmentation.

Male Genital System.

D. Timofeev³¹⁶_{v.9, No.11} studied the nerve-terminations in the male genital organs of mammals. In the testicle Golgi's method showed, besides the vasomotor nerves spread out in a plexus over the wall of the vessels, fibrils which ramify between the seminiferous canaliculi; but the author was unable to determine their mode of termination. At all events, he never saw them traverse the membrane proper and terminate, as has been stated by Sclavunos, among the seminal cells. In the epididymis the coni vasculosi are surrounded with abundant nerve-fibrils, which belong, perhaps, to their musculature. Finally the muscular coat of the deferent canal is occupied, as well as the mucous membrane, by the plexuses pointed out by the same author. Ehrlich's method gave more complete results, inasmuch as the epididymis and the vas deferens are concerned. The author observed, in the course of the nerve-branches penetrating into the epididymis, ganglionic cells, which, owing to the characteristics presented by them, may be considered as sympathetic cells. Ganglia also exist on the branches which ramify in the tunica adventitia of the vas deferens.

Urinary System.

Suprarenal Capsules.—The nerve-terminations in the suprarenal capsules in mammals have been made the subject of researches by A. S. Dogiel³²⁰_{p.90, '94} in certain animals (dog, cat, guinea-pig, rat, etc.). His results differ, using Golgi's method, upon certain important points from those obtained by Fusari, particularly with regard to the nerve-cells and the relations of the terminal nerve-fibrils with the cells. Of all the zones of the cortical sub-

stance the internal or reticulated zone is most rich in nerves. Each cellular group is surrounded by a more or less dense fibrillary plexus; but neither in this zone nor in the glomerular or in the fasciculated zones are any fibrils seen to penetrate into the intercellular spaces. In the medullary substance the nerves are extraordinarily abundant, their mass being greater than that of the glandular elements, properly speaking. They form, around the groups of medullary cells, dense plexuses which anastomose with one another. In the course of these nerves—as well on the larger as on the finer ones—thickenings are found, varying in form and decidedly characteristic, and which send off fine fibrils. Pericellular plexuses, originating in the fibrils, insinuate themselves between the cells and intercommunicate in such a manner as to form a terminal plexus, each mesh of which is occupied by a medullary cell. The nerves proceed in the same way with regard to the cells directly surrounding the venous capillaries of the suprarenal capsules. The nerve-cells are isolated or form groups more or less large. They are met with in the course of the nerve-trunks or in the medullary layer, or, likewise, at the limit of the latter and of the reticulated zone; more rarely in the latter or in the internal portion of the fasciculated cortical zone. Their number varies according to the species of animals. In the guinea-pig, the dog, and the cat two types of ganglion-cells may be recognized,—large and small,—all belonging to the category of the multipolar sympathetic cells. The smaller cells have, besides the cylindraxile prolongation, protoplasmic prolongations which ramify and terminate upon the surface of the large cells, which they surround by a fine net-work. These prolongations never present any special relations with the glandular cells. The larger cells are scarcely colored by Golgi's method; it is therefore impossible to say what becomes of their prolongations. To resume, there are, in the medullary substance, glandular and nerve-cells. These elements have no relation with each other and the nerve-cells in no way differ from those of any sympathetic ganglion. The nerves, after forming complicated plexiform arrangements, terminate upon the surface of the glandular elements.

Amnion and Umbilical Cord.

Lange ³⁹³_{V.29, No.1} ⁵_{Nov., '94} presents a contribution to the histological anatomy of the amnion and umbilical cord in the human embryo. His conclusions are as follow: 1. The epithelium of the amnion is not cubical or cylindrical, but a single layer of pavement epithelium. 2. The granulation of the dead amniotic epithelium does not depend on the presence of fat. 3. In the amniotic epi-

thelium there are no open mouths of lymph-passages. The pretended stomata are artificial, and arise through the rupture of degenerated mucous cells. 4. The umbilical epithelium is, as a rule, a three-, seldom four- or five- layered laminated epithelium, whose deep layer consists only of flat cells. 5. During embryonic life the differentiation into a laminated epithelium appears on the umbilical cord earlier than the division of the epithelium. 6. "Stomata" are not found in the epithelium of the umbilical cord. 7. The umbilical cord of a mature fœtus contains numerous elastic fibres within the connective tissue. 8. The cord contains no other lymph-channels than the connective-tissue corpuscles of Virchow. 9. These capillary lymph-channels are most probably susceptible of injection. 10. Between the epithelial cells of the cord can be found no branches of lymph-channels.

Eye.

Peschel, ²⁰¹_{V.39, No.2} in a dissection made with the aid of a magnifying glass, found, in the orbit of the rabbit, as many as eighty-five ganglia; he demonstrated an anastomosis originating from the trigeminus, the sympathetic, and the external motor oculi nerve, and extending into the branch of the common motor oculi which furnishes the levator muscles of the superior lid and inferior rectus. The ciliary ganglion in the rabbit is in intimate juxtaposition with the trunk of the third nerve, from which it receives eight nerve-fibres; it also receives one from the sympathetic and two other mixed branches from the sympathetic and the trigeminus. The author found twenty-five ciliary nerves, of which two originated in the ciliary ganglion. He made experimental extirpations of the ciliary ganglion. Immediately afterward the pupil became somewhat dilated and mydriasis gradually increased without ever becoming complete; accommodation was paralyzed and the sensibility of the cornea remained intact. According to the author, the ciliary ganglion is not associated either with the secretion of the intra-ocular fluids or with the nutrition of the globe.

Gutmann ⁷⁸_{Sept., '94} ¹²⁶_{Jan. 15, '95} injected coloring liquids into the canal of Schlemm in thirty-five cadavers, and positively confirms the opinion of Schwalbe concerning the communication existing between the anterior chamber and Schlemm's canal. There are intercellular spaces which allow liquids to traverse the endothelium of this canal; this migration may be compared to that effected by the granulations of Pacchioni through the cellular spaces found in the sinus of the dura mater.

In a study of the connections existing between the nuclei of the motor nerves of the eyeball, the posterior longitudinal bundle,

and the general reticular formation, A. Mahaim ⁵²_{May 25, '95} utilized the Golgi method, which enabled him to study the course of the nerve-fibres on an uninterrupted series of sections obtained by the aid of the von Gudden microtome. Mahaim undertook three series of experiments, and extirpated in newly-born rabbits, on one side only, either the motor oculi communis nerve, the pathetic, or the external motor oculi. Scarifying the animals at the end of a given time, he was able to note the constancy of the results obtained,—*i.e.*, the arrest of development, atrophy of the external portion of the posterior longitudinal fascicle, and a lesser development of the connections usually existing between the longitudinal fibres of the reticular formation and the nuclei of the pathetic and the external oculomotor.

Ear.

In a note upon the structure of the membrane of Corti, Coyne and Cannieu ¹⁸⁸_{p. 394, '94} state that the tectoria is not formed by a solid, compact mass of homogeneous substance, clear and transparent and traversed by darker fibrils. In their opinion, it consists of walls of a special substance, circumscribing polygonal cavities and presenting, in sections perpendicular with the striæ, the form of a net-work. The meshes of this net-work are quite large at the level of the organ of Corti; they grow narrower as they approach the projecting portion of the tectoria. It is the figure described upon the epithelium of Corti which has been termed the net-work of Loewenberg. Since the tectoria presents an internal insertion at the level of the organ of Corti and the external cells of Claudius, the vibratory cilia of the cells of Corti, according to a previous communication from the authors, lodge in the polygonal cavities of the tectoria. The reticulated lamina of Kölliker cannot properly be said to exist, it being merely the deep portion of the tectoria.

Cannieu also conducted researches concerning the auditory nerve, its branches and ganglia. ¹³⁶_{Apr. 1, '94} ¹²⁶_{July 15, '94} Up to the present time authors admit, for the two nerves of special sensibility (optic and olfactory), a sort of central prolongation. Cannieu has shown that the hearing does not form an exception to this rule, and that a bulbar prolongation is found in the auditory canal, which, in the cat and the dog, only penetrates to a distance of twenty or thirty millimetres, but occupies, in the mouse, not only the entire cochlear canal, but also the columellar cavity as far as the last turn of the spiral. According to Cannieu, the ganglia of Scarpa and of Böttcher, and that admitted by Schwalbe and Corti upon the posterior ampullar nerve, do not actually exist as isolated ganglia, but form a part of a ganglionic band extending from the anterior

cribriform lamina to the lower portion of the cochlea. The acoustic is constituted by two branches independent of each other, in the majority of mammals. In man, however, they are united in a principal trunk. The ampullar and saccular nerves are not, as is generally believed, an emanation from the cochlear nerve; in reality, they escape from the vestibular ganglionic band. From the distal extremity of this band there extends, in the mouse, a true nerve, which distributes itself throughout the first half of the lower spiral turn of the cochlea, —a nerve which may be considered as the morphological equivalent of the nerve of the lagena in the lower vertebrates. The fibres of the acoustic are not developed, according to the author, at the expense of the subventricular nuclei of the medulla oblongata, but have their origin in the nerve-cells of the vestibular and cochlear ganglia. In the mouse the facial is united with the acoustic at the level of the ganglion of Scarpa, which is itself united with the geniculate ganglion by a band of ganglion-cells. From this ganglion of Scarpa nerve-fascicles escape, which follow the course of the facial. The vestibular and cochlear nerves do not, as it is believed, form the anterior and posterior roots of the acoustic. Their fibrils divide, for each of these, into two fascicles, one anterior and the other posterior, corresponding to the ascending and descending roots of the sensory nerves of the spinal cord. Cannieu therefore compares the acoustic nerve to the sensory root of a mixed nerve of which the facial forms the motor filaments.

Skin.

Concerning the morphology of the secretory terminal nervous system, E. Arnstein ³¹⁶_{V.10,p.410} ¹²⁶_{Apr.15,'95} has been able to discover, in a certain number of glands (mammary, sudoriparous, prostate, salivary, pancreas) studied by himself and by several of his pupils, by the methods of Golgi and of Ehrlich, terminal nerve-apparatuses, in intimate relation with the glandular cells. Having described the appearance presented by these apparatuses, he resumes, as follows, their morphological characteristics: The glandular nerves, as well in the tubular as in the acinous glands, form a net-work which rests immediately upon the membrane proper (epilemmal net-work). From this net-work fine fibres go forth, which traverse the membrane and, becoming pericellular, enter into contact with the secretory elements. These fibrils do not form, below the propria, either a plexus or a net-work; but, after becoming divided or not, as the case may be, they continue, after a short course, in the form of varicose terminal apparatuses of varied conformation and dimensions. Occasionally they are represented by a very

wavy filament, covered with varicosities, and sometimes they affect a grape-like form; they are also frequently muriform. All of these forms may co-exist upon one and the same glandular cell, and may be united by anastomotic fibrils. In fact, we have here neither a terminal net-work nor free terminations, but a special, true, terminal apparatus, occasioned by proliferation and the secondary union of varicose fibrils.

K. Bauer^{2014 126}_{V.3, p.439, '04; Apr.16, '06} studied, on the one hand, the configuration of the sebaceous glands of the head, nose, and the glands of Meibomius, by means of reconstructions, and, on the other hand, the relation of the elastic fibres to these same glands and to the muscles. Plastic models clearly show that the sebaceous glands are alveolar. Basing one's self upon the configuration of the terminal glandular units, it is sometimes possible, however, to distinguish two types joined by transition forms,—a tubulo-alveolar and a purely alveolar type. All the glandular units present more or less developed ampullæ. When nothing interferes with the expansion of the *cul-de-sac*, the alveolar type manifests itself. When, on the contrary, obstacles in the form of hairs, muscles, or other alveoli reduce the available space, the union extends mainly in one direction, thus producing the tubulo-alveolar type.

The fine subepidermic elastic net-work is prolonged directly over the sebaceous glands. The erector pili not only attaches itself to this superficial net-work by elastic tendons, but also to the elastic periglandular envelope, by means of fibrils thrown off throughout its entire extent. The physiological consequence of these connections will easily be understood.

In the eyelid the elastic fibres are exceedingly numerous, particularly in the region of the free edge, where they form a veritable subepidermic plaque, as well as in the interstices of the glands of Meibomius. A very delicate elastic reticulum is also seen between the fibres of the orbicular muscle of the eyelids.

Sack, of Heidelberg,¹⁵²_{May 24, '06} reached the following conclusions upon the adipose tissue: 1. The nuclei of the adipose cells are, during almost their entire cellular life, principally vacuolated. 2. The vacuoles, which are easily seen in very fine and delicately colored sections, are spheroidal in shape. 3. They originate in the immediate vicinity of the nucleoles of the nuclei; in a word, they are paranucleolar. 4. They increase either spontaneously or by the confluence of two neighboring vacuoles. 5. Gradually, as they increase, they approach the periphery of the nucleus and end by escaping in the direction of the cellular cavity. 6. They do not contain fatty matter; their contents are probably aqueous, possibly alkaline or saline. 7. The phenomenon of vacuolization

only occurs in the adipose tissue of children or adults whose nutrition is good. It is not observed in the embryo or in old people, as well as those whose subcutaneous adipose layer is in a state of extreme atrophy. 8. A certain relation must therefore exist between this phenomenon and the nutrition of the tissue. 9. Only vague hypotheses may be formulated concerning the part played in life by the adipose cell. Nevertheless, the phenomenon of vacuolization of the nuclei of the normal adipose tissue seems to prove that the nucleus of the fat-cell must fulfill some nutritive or even secretory function in the life of the cell. All of these facts have escaped the notice of histologists up to the present time.

F. H. Champneys and A. A. Bowley²_{June 15, '95} contributed observations on the development of mammary functions by the skin of lying-in women. They conclude that (1) the lumps consist of modified sweat-glands; (2) the fact that various mammary secretions are produced by modified sweat-glands seems to show either that mammary tissue is not necessarily a direct modification of sebaceous gland-tissue or that similar secretions can be produced by more than one variety of skin-gland. In this connection it may be remembered that the ceruminous glands of the ear which secrete "wax" are coiled-tubular, and not acinous in structure.

According to E. Lacroix^{920 126}_{Oct. 29, '94; Apr. 15, '95} all the glandular cavities, the acini, and the excretory ducts of the breast are lined, upon the internal surface of their vitreous membrane, below the epithelium, whether secretory or merely a coating, by cells, likewise epithelial in nature, which are ramified and anastomosed in such fashion as to form a continuous net-work with nearly circular meshes. These cells are identical with those described by Boll in the lachrymal gland, and which are known under the name of "basket-cells" (*cellules en panier*). Several characteristics of these cells allow of their consideration in the light of myoepithelial formations, particularly their special fatty brilliancy, the delicate fibrillation of the substance of the net-work, and, finally, the constant position of the nuclei upon the surface and not within the body of the net-work. The author questions whether these basket-cells are not of capital importance in the mechanism of the glandular secretion. If we actually recognize contractile properties for these cells it will be readily understood what an important part they must have in the expulsion of the products of secretion.

Hair.

A. von Brunn²⁹_{v. 44, p. 207} studied the radicular sheath of the hairs:

1. External sheath. The most superficial cells of this sheath are in the form of a very flat biconvex half-lentil having a portion of

the edge cut off parallel with the plane of the section. The most deeply located elements are completely flattened. All these cells are united by protoplasmic bridges having a slight thickening in their centre. They also present the fibrillary structure described by Kromayer in the cells of the layer of Malpighi. In the superficial layers these fibrils are perpendicular to the vitreous membrane; they radiate in the median and are circular in the internal layer. 2. Internal sheath. In conformity with the opinion of Ranvier the elements of Henle's layer are all nucleated. The nuclei are smaller and thinner in the horned cells than in the others, but they are absent in none, even in the already desquamated cells met with above the free edge of the internal sheath, between the epidermis of the bulb and the hair itself.

The holes described between the elements of Henle's sheath are perfectly normal and constant. They contain the prolongations of the cells of the layer of Huxley. Between the elements furnished with keratohyalin and those highest up, having already reached the term of their transformation, there exists a zone characterized by cells which do not become colored. Finally, grains of eleidine are found even in the cuticle of the sheath, but only upon a limited region and beginning at a great distance above the bottom of the bulb (one millimetre). This substance presents varied aspects according to the regions, sometimes having the form of spherules, or of twigs or fibrils, which differences may, perhaps, be due to variations in the texture of the protoplasm.

Nails.

G. Sperino,¹²⁶
Oct. 15, '94 in studying the arrangement of the elastic tissue in the bed of the nail, found that it resembles that met with in the mobile portions of the skin, while in the finger-pulp it is analogous to that found in less mobile regions. While the abundance of elastic tissue found in the uterus and liver, which are subject to changes in volume, is easily comprehensible, it is more difficult to explain its presence in points where the skin is as adherent to the bone as in the ungual bed; and it may be questioned whether, in the intimate functions of the tissues, the elastic element does not take a different part from that attributed to it, owing to its elastic property.

Teeth.

The nerve-terminations in the teeth have always been difficult to ascertain, owing to the hardness of these organs, the delicate nerve-fibrils being almost invariably destroyed. Retzius³¹
May 22, '95 devoted himself to the question, and ended by obtaining good results

by the aid of Golgi's method. In the teeth of rats he was able to see the nerves of the pulp resolve themselves into fine varicose fibrils which extend through the layer of odontoblasts as far as the dentine, but do not penetrate into the latter. These results should be subjected to further verification, since they but imperfectly explain the very great sensibility of the ivory,—the odontoblasts seeming to be very poorly organized for the function of sensory transmission.

TECHNOLOGY.

Staining.—The Golgi method formed the subject of an interesting discussion in the Section of Anatomy and Physiology of the Royal Academy of Medicine of Ireland. ^{June, '96} Symington showed sections of the central nervous system stained by Golgi's method, which he had made last summer in Kölliker's laboratory. Most of the specimens were hardened and stained by the rapid method,—viz., small pieces of fresh tissue were put into a mixture of 1 part of a 1-per-cent. solution of osmic acid and 4 parts of a 3.5-per-cent. solution of bichromate of potassium. After being a few days in this mixture it was transferred to 0.75-per-cent. solution of nitrate of silver. All the sections were mounted in xylol-balsam, and so far they had kept perfectly. He had found the methods easier and more reliable than it was generally supposed to be. The difficulties that occur with Golgi's method are several: 1. Uncertainty. One may get a good or bad preparation, even though using the same treatment. A method which stains one cell and leaves fifty other of the same kind unstained will make one doubtful of the validity of that method. 2. The preparations must be made on a particular date. If left longer in the solution the preparation is destroyed. 3. It is not permanent. Sometimes the specimens become covered with a granular cloudiness. The only part of the treatment which he did not follow out accurately was in using oil of cloves instead of xylol, which might account for this. The chief objection is that some cells stain and some do not. One cannot say that where the staining stops the process of the cell also stops. It is necessary to work with young animals to get good results. His preparations were made from rats killed the day they were born. He found the chief difficulty in photographing was that the sections were thick, and that all the processes were not in the same plane, and consequently not in focus at the same time. He found that different parts stained with different degrees of difficulty. The cells of the cerebrum and fascia dentata

were easy, but the cells in the spinal cord and cerebellum were not easy to stain. He also found that, as the preparations could not be imbedded in the usual way, it was difficult, especially where the cells have long processes, to cut the processes in their entire length. McWeeney did not think it so very difficult a method. He did not find that it made any difference if he left the preparations in the solution some time longer than necessary. To clear the sections he first placed them in creasote, then in xylol and carbolic acid, and then in xylol. Finally, he mounted in Canada balsam, without using a cover-glass. He found that there was a tendency to the deposit of a coarse granular precipitate on the physiological surface of the section. Symington, replying, said that, if all the cells were stained by this method, one could see nothing but a black mass. Because one cell stains and another does not there may be theoretical grounds for stating that processes of cells anastomose. But a large number of men had been at work, and no reliable observer had seen the nerve-fibres uniting; and, besides, one can often trace some of the fibres to a free point, which is very strongly against anastomosing.

The third objection formulated by Symington is overcome by E. Kallius,¹¹⁰⁹ who recommends the following procedure to render permanent preparations made by Golgi's method: It consists in reducing the chromate of silver adhering to the tissues to the condition of metallic silver. With this end in view, the author develops the sections by means of a developing mixture of hydroquinone and absolute alcohol. The reduction having been accomplished, the sections are washed in pure water and are then treated for several minutes with 70-degree alcohol, after which they are fixed with a solution of hyposulphite of soda. These manipulations finished, they are mounted with balsam. The preparations may also be previously colored with carmine, hæmatoxylin, etc., and reagents—potassium, for instance—which would have injured unreduced sections may be used upon those thus prepared.

Ceni, of Pavia,⁵⁸⁹ recommends a modification in the coloration of the nerve-elements with bichloride of mercury. After the preparations have been removed from the solution of corrosive sublimate, they should be washed off with water and laid in alcohol for several hours. After having been cut up with the microtome, they are to be placed in a solution of ammonia: 3 to 4 drops in a watch-crystalful of distilled water. An immersion of from four to five minutes suffices to give a fine, dark color to the nerve-elements. Longer immersion is not injurious.

Inghilleri,⁵⁰ gives a new, rapid double-staining method for bacteriological examination of the blood and other tissues, in-

cluding the study of phagocytosis and parasites of malaria, which he claims to excel not only in quickness, but in precision. A cover-glass preparation (by the usual methods), or a section prepared from the tissues, is placed in chloroform for thirty minutes, and afterward stained in the following fluid: One-per-cent. solution of eosin in 70-per-cent. alcohol, 40 parts; saturated aqueous solution of methylene-blue, 60 parts. The specimen is gently warmed in this fluid for two or three minutes, after which it is ready for immediate observation (for example, blood, etc.), or after dehydrating, clearing, and mounting as usual.

Koch, of Berlin, ⁴⁹⁹_{Apr., '96} employs the following solution of methylene-blue: Saturated alcoholic solution of methylene-blue, 1 drachm (4 grammes); solution of caustic potash (10 per cent.), 12 minims (0.78 gramme); distilled water, 200 drachms (800 grammes). This stain is very active in a feebly alkaline state.

Hardening. — Marcus, of Stockholm, ⁷⁵_{No. 1, '96}; ⁴⁵¹_{May, '96} considers the Weigert-Pal formol method an excellent one for hardening tissues. When the latter are rendered friable and distorted in Müller's fluid and alcohol, they become elastic in formol and keep the normal relations between the different component parts. The pathological alterations appear with greater clearness and distinctness. The method is as follows: A spinal cord prepared as usual is placed directly in a solution of half of 1 per cent. of formol, where it remains from two to four weeks. A portion of the cord, half a centimetre in length, thus hardened is placed in the incubator in Müller's fluid, at a temperature of 37° C. (98.6° F.). At the end of eight days it is placed for twenty hours in 95-per-cent. alcohol, and for the same time in absolute alcohol, mounted in celloidin, and cut. The sections are again placed in Müller's fluid in the incubator and allowed to remain there for even as long a period as eight days, rapidly washed in alcohol, and placed in the Weigert-Pal hæmatoxylin for at least two days; then deodorized, etc., according to the method of Pal. The method is complicated, but the author thinks that this may be in time overcome. The myelin takes a pretty blue color; the degenerated portions remain uncolored. The ganglionic cells remain very distinct.

Marie, of Paris, ¹¹⁵³_{Jan. 12, '96} also considers formic aldehyde, or formol, a rapidly-acting reagent, but employed as follows: The brain or the spinal cord is plunged in a solution of formol of 1 to 100. About 700 to 800 cubic centimetres (22½ to 25½ fluidounces) of the solution are required for a spinal cord and 2 litres (quarts) for a brain. After several days the cord will have acquired a firm, elastic consistency, without any alteration in form, volume, or even color. The brain requires four to five days to harden. The prep-

arations may then be withdrawn from the formic solution, and sections at once be made, in order to circumscribe the lesions. Sections thus prepared may be colored according to the principal methods used in the study of lesions of the nervous centres. After having been taken from the formol, small fragments may be directly immersed in osmic acid, and after twenty-four hours they may be cut with or without preliminary inclusion. The myelin of the nerve-tubes very quickly takes on the characteristic black color, with the exception of the axis-cylinder, which is plainly defined in white. The nerve-cellules are perfectly preserved in form; the nucleus and the nucleolus are visible.

After the formol the preparations may also be put into alcohol. They do not change in form or shrink, and rapid inclusions in celloidin may be made and fine sections obtained. These sections are easily colored by all aniline colors and by hæmatoxylin. The picrocarmine of Ranvier also colors them, but slowly and faintly. Azoulay's method of successively treating the sections having been immersed in alcohol, by osmic acid and tannin, for the purpose of coloring the myelin in black, may also be used. Finally, the methods of Weigert and of Pal for the study of degenerations are applicable. It is only necessary to receive the sections in a solution of chromic acid, and to allow them to remain some time therein, and afterward to cause their coloration and differentiation with the ordinary reagents.

Gilbert Ballet¹⁴_{June 16, '96} proposed the following method for the treatment of myelin,—a modification of that of Pal: (1) plunge the sections in a hot solution of hæmatoxylin of 40° to 45° C. (104° to 113° F.); (2) wash them and afterward immerse them in a mixture of a 1-per-cent. solution of acetate of copper and of osmic acid; (3) afterward put them in a solution of permanganate of potassium; (4) finally put them into a mixture of a solution of oxalic acid and of a solution of sulphate of potassium.

T. S. Cullen, of Baltimore,⁵⁹_{June, '95} found that formalin (see 1895 ANNUAL, vol. v, H-31) could be used with advantage in the preparation of frozen sections. He was able to make permanent specimens from the frozen sections in fifteen minutes, and the specimens were as good as those hardened in alcohol for several weeks and then imbedded in celloidin. Frozen sections, after being treated with formalin, are rapidly passed through 50-per-cent. and absolute alcohol; they may then be stained in the same manner as any other hardened section would be.

Mounting Media.—After trying monobrom-balsam, Piffard, of New York,⁵⁹_{May 4, '95} concludes that it is superior to Canada balsam and other media already tried, exhibiting histological details and

bacteria very much better than balsam and not open to the objections (lack of permanency, loss of refractive index, etc.) that have been urged against it. For temporary mounts demanding immediate examination its advantages over the ordinary balsam are very evident. In connection with permanent mounts there is one inconvenience. The mixture dries very slowly, and, even weeks after mounting, the slightest force will displace the cover-glass from its position on the slide. The best procedure, according to Piffard, is to carefully centre the cover on the slide and then put it away for a week or two, after which adjust the slide on the turntable and spin a ring of cement (shellac is best) around the edges of the cover. Instead of using balsam dissolved in monobromide, a more desirable mixture, and one of higher index, may be prepared by substituting purified liquidambar for the balsam. The following formula is given by the author: "Procure a pound of the crude gum (an exudation from the *Liquidambar styraciflua* L.) and put it in a water-bath to liquefy. Arrange, also, a Plantamour jacketed funnel, with glass funnel inside, and two or three thicknesses of cheese-cloth. When the gum is sufficiently liquefied and the Plantamour funnel hot, proceed to filter. The filtrate should be received in a quart bottle. When cold add one pound of xylol. This should be mixed as thoroughly as possible with the filtered gum and well shaken with it several times a day for at least two weeks. At the end of this time filter the mixture two or three times through absorbent cotton or Swedish paper. The product will be a thin, but perfectly clear and transparent fluid. This must now be concentrated by gentle heat, and the process may be considered complete when the warm liquid has about the consistency of thick molasses. When cold it forms a semisolid mass, extremely sticky and tenacious. Two parts of this should be mixed with three parts of monobromide of naphthalin and a little gentle heat applied. The result will be a clear, amber-colored fluid. Its refractive index should then be tested and brought to 1.625 by the further addition of whichever of the ingredients may be necessary. Care should be taken to use the proper gum, as above indicated, which is the American 'sweet gum,' and not the gum from either the *Styrax officinale* L. nor the *Liquidambar styraciflua* Miller."

Piffard considers the "naphthalin-ambar" as the mounting media of highest index, thus far produced, that can be put to practical use in bacteriological and histological work, and, consequently, the one best calculated to exhibit the intimate structure of this class of objects.

PHYSIOLOGY.

By W. H. HOWELL, A.B., PH.D., M.D.,

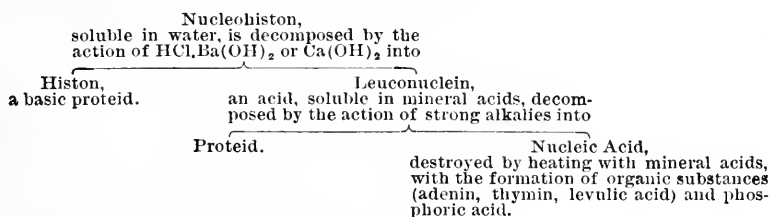
AND

G. P. DREYER, A.B., PH.D.,

BALTIMORE.

Blood.

The Coagulation of Blood.—A very important investigation upon the coagulation of blood is contributed by Lilienfeld,⁸³ v.20,p.89,'96 which contains a brief historical introduction outlining the modern theories of coagulation, and many of the seeming discrepancies in the results and views of other investigators find an explanation in his own interesting experiments. His work starts with an account of the relation of nucleohiston to coagulation. This substance is a compound of a basic proteid with an acid nucleoproteid,—leuconuclein,—is found in the nuclei of leucocytes and lymphocytes, and is a representative of a class of compounds found in other cells. The following schema of the decomposition of this body is useful in following his experiments:—



Nucleohiston has the property of causing or hastening coagulation in cold horses' plasma or pepton-plasma, but retarding or preventing coagulation in proplastic liquids,—i.e., liquids, such as salted plasma or the transudata, which clot upon the addition of fibrin-ferment. He concluded that nucleohiston contains two substances, one of which hastens coagulation, while the other retards or prevents it. The first decomposition products of nucleohiston—viz., histon and leuconuclein—were tested separately as to their effect upon coagulation. It was found that leuconuclein had no retarding effect upon coagulation, but, on the other hand, had no direct coagulating power itself. When, however, this

leuconuclein was added to a liquid containing fibrinogen a precipitate was produced which, when obtained pure, clotted quickly upon the addition of calcium or barium salts. It was further found that nucleohiston itself—as well as the leuconuclein, or nucleinic acid, produced from it—produced a similar body when added to pure fibrinogen, and that the precipitate thus formed, when dissolved with the aid of a little sodium carbonate, gave a clot, in a short time, upon the addition of a few drops of CaCl_2 solution. Moreover, the same substance may be produced from fibrinogen by the action of dilute acetic acid, the precipitate, when dissolved, giving a clot with calcium solution. To this substance which is formed from fibrinogen by the action of acetic acid and the acid-nuclein compounds he gives the name of *thrombosin*.

Long ago Hammarsten showed that in the act of coagulation fibrinogen splits, a portion of the molecule going to form fibrin, while a smaller portion remains in solution as a globulin,—fibrin-globulin. Lilienfeld endeavors to ascertain whether, in the formation of thrombosin from fibrinogen by the method stated above, there remains anything comparable to this fibrin-globulin. He finds that a soluble proteid is formed from the fibrinogen upon the precipitation of thrombosin, but is not able to demonstrate its globulin nature; by his method of preparation it partakes more of the nature of an albumose. It seems, however, that acetic acid and the nucleins in acting upon fibrinogen decompose it, with the formation of thrombosin and a soluble proteid. Thrombosin itself does not coagulate, but when brought into contact with soluble calcium salts it forms a clot composed of typical fibrin. Chemical examination of this clot shows that it contains calcium, and is probably a definite chemical compound of calcium and thrombosin. In previous microchemical work in which he made use of differential stains Lilienfeld had shown that the threads of fibrin in normal coagulation are directly connected with and seemingly start from the nuclei of the leucocytes, as well as from the blood-plates. Moreover, he had shown that blood-plates contain a nuclein compound. Upon the basis of these observations, taken with the results of the present investigation, he offers the following theory of coagulation: After blood is shed there occurs a disintegration of the leucocytes (and blood-plates) or a giving off of nuclein-substance to the blood-plasma. These nuclein-substances dissolve in the alkaline plasma and come in contact with the fibrinogen. The fibrinogen is decomposed, with the formation of thrombosin, and this latter substance unites with the calcium salts of the plasma to form an insoluble calcium compound,—namely, fibrin. An unsatisfactory part of the paper deals

with the subject of fibrin-ferment. This substance exists in blood-serum after clotting, as is well known, and usually has been supposed to be the immediate agent acting upon the fibrinogen. In Lilienfeld's theory no place is given to fibrin-ferment unless we suppose that the nuclein-substances, together with calcium salts, represent the so-called ferment. Indeed, according to Pekelharig's well-known theory, fibrin-ferment is a compound of calcium and nucleo-albumin. Lilienfeld, however, cannot support this view of the nature of the ferment. Examination of solutions of the ferment proved to him that it contains no nuclein, but is, as Halliburton stated some time ago, a globulin compound. He believes that the ferment is not, therefore, an antecedent of fibrin or a fibrin factor in normal clotting, but rather a product of the act of clotting, although from what it is formed he leaves unstated. According to this view, the ferment is formed only after clotting or during clotting, and owes its undoubted coagulating power to the fact that probably it is able to split off thrombosin from fibrinogen in a similar way to the acids and nucleins. Inasmuch as Lilienfeld's results in this particular are in direct contradiction to those of Pekelharig, it is evident that further independent investigations are necessary before any definite conclusion can be reached. If Lilienfeld is correct and fibrin-ferment is a globulin-like body possessing ferment properties, it would seem to the reviewer that his theory of coagulation, as applied to normal clotting, is subject to some criticism, since it is generally believed that fibrin-ferment can be obtained from shed blood before clotting begins, and it remains possible that in normal clotting the ferment may be actually concerned instead of or as well as the nuclein-substances liberated from the leucocytes. A very important part of Lilienfeld's paper deals with the properties of the histon which may be split off from nucleohiston. When histon in neutral solutions is injected into the blood of a living animal in proper quantities (0.3 gramme— $4\frac{1}{2}$ minims—to 1 kilo— $2\frac{1}{2}$ pounds—of animal) blood that is drawn shortly thereafter refuses to clot at all. This histon-blood shows some remarkable peculiarities. The leucocytes and the blood-plates are perfectly preserved; the latter remain isolated and entirely normal in shape. The red corpuscles show a marked tendency to settle quickly, giving a clear histon-plasma. This plasma, unlike the plasma from blood prevented from clotting by albumose solutions, is not clotted by the action of CO_2 , by acetic acid, nor by dilution with water. Addition of nuclein compounds will, however, cause it to clot. It would seem that the histon prevents, in some way, the formation of the nuclein-substances from the leucocytes. This action of the histon explains the retarding effect

upon coagulation, observed under certain circumstances, of injections of nucleohistons into the circulating blood, since the nucleohiston under these conditions probably breaks up, with formation of leuconuclein and histon.

Nucleoproteids.—Halliburton,¹⁷⁸_{v.18,p.306} in a brief paper upon nucleoproteids, admits that the cell-globulin β (see ANNUAL for 1889), formerly described by him as obtained from lymphoid cells, is in reality a nucleoproteid. He finds nucleoproteid in the red marrow, where it is noteworthy on account of the high percentage of phosphorus, and also in the stromata of the red corpuscles. In connection with the foregoing paper by Lilienfeld, it is interesting to find that in the present paper Halliburton confirms Pekelharig's statement that fibrin-ferment, prepared by Schmidt's method, contains nucleoproteid, giving an insoluble residue upon pepsin-hydrochloric digestion. He thus gives up his former view that fibrin-ferment is a cell-globulin, in spite of the confirmation by Lilienfeld of his original statement. From the combined work of Pekelharig and Halliburton there can be no reasonable doubt that fibrin-ferment contains a nucleoproteid.

Intra-venous Injections of Peptone and their Influence on the Coagulability of the Blood of Dogs.—Knowing that an injection of peptone sufficient to render the blood non-coagulable for a time will leave the animal immune to a second injection after the effects of the first have passed off, and that trypsin will similarly counteract the effect of a peptone injection, although itself having no influence on the coagulation, Ch. Contejean⁴¹⁰_{p.45, '95} undertook a series of experiments to determine whether the anticoagulating effect of peptone injections could be prevented in any other way. His results may be summed up briefly as follows:—

Injections of considerable quantities of peptone into serous cavities neither render the blood non-coagulable nor counteract the usual effect of subsequent intra-vascular injections of peptone.

On the other hand, dogs are protected against the anticoagulating action of peptone injections by the previous intra-venous injection of small quantities (1 cubic centimetre—15 minims—per kilo—2½ pounds) of peptone-plasma from another animal, and likewise, though not so thoroughly, by injecting the blood-serum of an immune dog into the peritoneal cavity.

Some Changes in the Blood after Hæmorrhage.—Giacinto Viola and Guiseppe Jona⁴¹⁰_{p.37, '96} studied the effects of bleeding upon the condition of the blood with reference to the following points, using, mainly, dogs for their experiments, but also some rabbits: (1) the alkalinity of the plasma, exclusive of the corpuscles; (2) the isotonic resistance of the red corpuscles; (3) the hyper-

isotonicity of the blood-serum, by which is meant the power which the serum has of compensating the dissolving action of a sub-isotonic salt solution. As to their method, it should be noted that certain changes adopted by them in determining the resistance of the red corpuscles to solution enabled them to separate the red corpuscles into three groups of unequal resistance. A small number—consisting probably of the most recently formed corpuscles—do not dissolve in a solution containing as little as 0.16 per cent. NaCl. Others, also in small number, still dissolve in a 0.52-per-cent. solution; these are the least resisting. The great bulk of the red corpuscles fall into the intermediate group, which, in the dog, may be said to resist solution when the quantity of NaCl reaches 0.44 per cent.

The results show that the alkalinity of the plasma, the isotonicity of the corpuscles, and the hyperisotonicity of the serum undergo very nearly parallel changes, which find a ready explanation in the sudden and rapid return of the tissue-lymph laden with katabolic decomposition products, and having, therefore, its alkalinity much reduced.

The alkalinity of the plasma begins to diminish very soon after bleeding, reaches its minimum in two hours, after which it rises more slowly back to the normal, reaching it in every case in less than one day.

The isotonicity of the corpuscles, taking those of mean resistance as an index, undergoes a parallel change, the resistance diminishing at first, to return afterward to the normal. As this change is so sudden and transitory and the return to the normal condition accomplished before the normal composition of the plasma, aside from its reaction, is restored, these variations in the resistance of the corpuscles are attributed directly to the parallel changes in reaction.

Examination of the corpuscles for a number of days following the hæmorrhage brought out another interesting fact. After about seven days the resistance began to increase above the normal and rose to a maximum about the twenty-fifth or thirtieth day. Examination of the spleen and red marrow at this time showed an active development of red corpuscles taking place. This, among other things, led to the view stated above, that the newly-formed corpuscles probably constitute the group of "maximal resistance" always present in the blood.

The hyperisotonicity falls and rises, also, because the concentration of the plasma is diminished by the lymphatic current. As the differences in mineral salts between plasma and lymph are insignificant, the marked changes in the plasma are taken to

indicate that other substances, of different sorts besides mineral salts, play a part in determining the relation of plasma to corpuscles.

Circulation.

The Isolated Mammalian Heart.—Langendorff²⁴⁶ has perfected a new method of isolating the mammalian heart. He removes the heart from the chest and keeps it alive by feeding it with defibrinated blood through the coronary arteries. The heart, of course, was kept at the body-temperature by means of a warm bath, and its contractions were recorded by a hook fastened into the apex of the heart and connected by a string with a recording tambour. A number of interesting observations were made, some of which are corroborations of those previously recorded by Martin in his well-known observations upon the isolated mammalian heart. Among the new facts recorded, the following are, perhaps, the most interesting: A heart thrown into fibrillar contractions by tetanic shocks or otherwise may recover its power of co-ordinated beats spontaneously; this was especially true of the rabbit's heart. But, with the dog's, as well as the rabbit's, heart, recovery was more certain if the flow of blood to the heart were stopped until the heart became asphyxiated and the supply of blood was then renewed. He finds, also, that mere stoppage of blood-flow through the coronaries never produced the condition of fibrillar contractions; the heart-beats merely weakened to complete cessation. It follows, therefore, that fibrillar contractions brought on by ligation of a coronary vessel are not produced by mere stoppage of blood-flow, but by some accompanying injury to the musculature or nerves of the heart. As in the case of the frog's heart, he was able to wash out the coronary system completely with normal saline—0.7 per cent.—until the heart had ceased beating, and then, by supplying defibrinated blood, bring back normal rhythmic contractions.

On the Escape of the Heart from Vagus Inhibition.—T. Hough¹⁷⁴ states that the escape of the heart from vagus inhibition is not the result of exhaustion of the vagus fibres either from continued conduction of impulses or from loss of irritability at the point of stimulation. The author's results support those of previous investigators with reference to this point. The efficiency of inhibition,—which may be measured (1) by the extent of slowing produced; (2) by the length of time the heart, if stopped, is held at stand-still; (3) by the rapidity or extent, or both, of escape during prolonged stimulation,—contrary to the statement usually made, varies inversely with the vigor of the heart in the cat and

dog. The more vigorous the heart, as shown by the pulse and blood-pressure, the more difficult it is to cause inhibition. In this connection it was also observed that the initial stand-still in dogs is almost always of much shorter duration than any subsequent one, as if the stoppage of the heart in some way exercised an injurious action upon the organ so that it was unable to escape so easily from inhibitory influences. This is also opposed to the ordinary conception as to the influence of the vagus on the heart.

Passing to the phenomena of escape from inhibition, it is shown, both by references to the literature and by a repetition of the experiments, that in cold-blooded animals, such as terrapins and snakes, the heart can be inhibited for an indefinite period without escaping. On comparing cats, rabbits, and dogs, the well-known escape comes on in all in the same way; so that the differences shown by them are simply those of degree, and not of kind. In cats the escape is rapid and extensive,—in fact, complete, in certain cases of strong, uninjured hearts; in rabbits and dogs it appears later and is never complete.

In general, two periods can be recognized in the escape-curve,—in the first the beats are separated by comparatively long intervals, which are not necessarily regular nor regularly diminishing in duration; in the second the heart beats regularly and more rapidly, but slower than normal. According as the first is abruptly separated from the second or merges insensibly into it or, lastly, is absent altogether, as may happen, three types of escape are recognized.

The end result, except in the case of strong cats noted above, is that the rate of beat and also the blood-pressure gradually increase to some point below the normal, where they remain approximately constant, although the stimulus is kept on the nerve continuously so long as thirty minutes.

The extent of the escape depends partly upon the strength of the stimulus, but chiefly on the condition of the heart, as to the amount of anæsthesia. The deeper the anæsthesia and the stronger the stimulus, the lower the level reached by the pulse and pressure. The existence of this constant subnormal level is interpreted as indicating a condition of equilibrium between two opposing forces at work in the heart,—the inhibitory impulses, on the one hand; the physiological processes producing the heart-beat, on the other.

Some of the more commonly occurring irregularities of the escape-curve are also described in detail. The escape from very slight slowing, as obtained by weak stimuli, is more rapid and more complete than that from stand-still or marked slowing; this

shows that there is no ground for the assumption, which is often made, that the escape is the result of some sort of exhaustion of the inhibitory apparatus during functional activity.

Further evidence against any "exhaustion" theory is found in the rapid recovery of the inhibitory power after taking off the stimulus. When this is taken off at the appearance of the first escape-beat the heart can be stopped again after ten to twenty seconds. In one case, after stimulating thirty-seven minutes, the current was again thrown in, after a pause of one minute and thirty-five seconds, and stopped the heart longer than it did the first time.

Although many difficulties stand in the way of making an accurate study of the relation of the escape to the strength of the stimulus, certain points seem to be established. For instance, it is shown that minimal stand-still stimuli do not stop the heart so long as stronger ones; but that, if the strength of the current be slightly increased, a point is soon reached beyond which any increase produces little or no change in the duration of stand-still.

Again, the extent of the escape, both as to rate and pressure, stands in an inverse ratio to the strength of the stimulus, as already mentioned. This comes out not only when comparing stimuli which produce different degrees of slowing or one of which slows while the other stops the heart, but also when both stimuli are strong enough to produce complete inhibition. The last case is interesting, as it shows that, while the increased strength of the stimulus was unable to prolong the stand-still itself, it was, nevertheless, producing a greater effect, manifested in the final lower escape-level, and that one was, therefore, not dealing with maximal stimulation.

Finally, it is found that the escape-level is reached sooner during stimulation which produces minimal slowing than it is with stronger stimulation producing marked slowing or stoppage.

When the heart has escaped from the inhibitory effect of stimulating one vagus, shunting the current into the other has no effect; this result agrees with what Tarchanoff, Gangee, and Priestley found before.

The general conclusion drawn from all these facts is that something else than fatigue of the inhibitory apparatus is the cause of escape, and the following explanation is suggested:—

Inhibition being conceived of as a sort of resistance to the development of those katabolic changes which result in a heart-beat, these changes "gather head" against this resistance and ultimately overleap it,—*i.e.*, there is escape. When only slight inhibitory resistance is made the time required to gather head is

short and the beat is merely slowed; stand-still would be caused by resistance of such amount that considerable time elapses before the beat can be produced against it. The gradual increase during the escape is explained as the ordinary "staircase phenomenon," while the final establishment of the escape-level is the establishment of equilibrium between the katabolic changes of the beat and the inhibitory resistance.

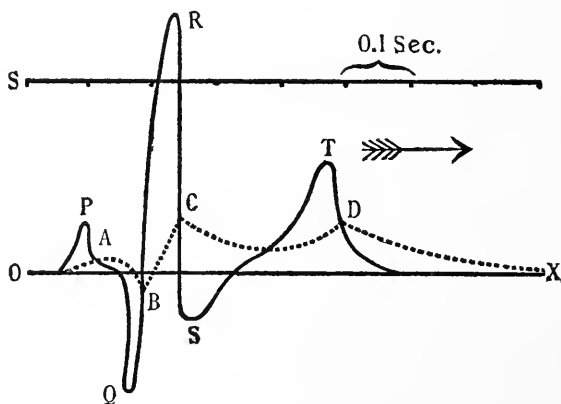
On the Form of the Human Electrocardiogram.—The first records of the electrical changes accompanying the beat of the human heart were obtained by Waller, in 1889, by means of the capillary electrometer. But Waller admits that the instrument is not capable of showing the exact form of the sudden changes in electrical potential, either as to duration or extent. Among the disturbing factors coming into play must be included the effects of jars to the instrument, of the variation in the points of application of the electrodes, and chiefly of the inertia of the mercury. The true electrocardiogram can therefore be obtained only by constructing it from various data taken from the recorded curves, from the properties of the particular instrument used, from the magnification and from the rate of movement of the sensitive plate.

A method for making these corrections and for obtaining the true form of the electrocardiogram is described by Einthoven.²⁴⁶
The different steps involved are too minute to be briefly reported, especially those which deal with the determination of the "constants" of the electrometer. The latter are derived from the results of the author's previous studies on the rate of movement of the mercury in the electrometer, published in two earlier papers.

By applying these corrections the author obtains curves which undoubtedly give the most exact picture of the electrical changes in the heart hitherto published.

The figure is a rough reproduction of the curves given by the author. The curve represented by the dotted line is the observed or rather photographed record; the curve formed by the continuous line is the result of making the necessary corrections. The recorded curve itself differs from those of Waller and of Bayliss and Starling in showing four crests,—a result which is due to the increased perfection in the apparatus. Of these four crests those lettered *A*, *C*, and *D* rise above the base-line and indicate negativity of base toward apex, while *B* signifies that the apex is negative to the base. The corrected curve shows, however, that the differences of potential are not only greater than observed, but also that the oscillations are more numerous. There are, in reality, five points to the curve,—*P*, *Q*, *R*, *S*, and *T*. The complete interpretation of this electrocardiogram is not attempted at present, the author

being engaged in a study of the possible influence which various factors—such as position of the body, position of the electrodes, rate of the heart, etc.—may have upon it. The second part—*R, S, T*—seems, however, to correspond to the curve of Bayliss and Starling, and according to them would be the expression of the ventricular systole, especially as it agrees exactly in duration with this phase of the heart-beat. If this be true, it would seem to follow that the portion *P-Q* corresponds to the auricular systole, —a conclusion which the author is not willing definitely to accept before his studies are completed. It may also be noted, in passing, that this new and perfected electrocardiogram supports the evidence against Fredericq's theory that the heart-beat is a sort of tetanus.



CONSTRUCTION OF AN ELECTROCARDIOGRAM ACCORDING TO DATA TAKEN FROM THE CURVE OBTAINED BY DIRECT REGISTRATION. (EINTHOVEN.)

Archiv für die Gesamte Physiologie.

On the Function of the Septal Nerves of the Frog's Heart.—

The numerous and carefully-executed section and stimulation experiments made by Franz Hoffmann²⁴⁶ upon the frog's heart throw new light upon a number of doubtful points in regard to its intrinsic nervous mechanism.

In the first section of the paper it is shown that the septal nerves have no connection whatever with the production of the normal sequence of the heart-beat, and incidentally that the stand-still of auricle and ventricle, after separation from the sinus, is not due to mechanical stimulation of the terminal intra-cardiac branches of the vagi. These conclusions rest on the following experimental facts: 1. Section or ligature of the septal nerves, even excision of the entire septum along with Remak's ganglion, does not disturb the regular sequence of the beat. 2. Division of the entire auricular walls, barring the septal nerves, which were carefully isolated, produces

the same result as the first ligature of Stannius, 3. Ligating any portion of the walls of the auricle in turn, so long as some part of it remains to connect sinus with ventricle, produces no permanent disturbance of rhythm. Stand-still of the ventricle results only when the last bridge of auricular wall is severed. 4. The most interesting experiment consisted in making an oblique section through the heart in such a way that the upper part contained the precavæ, a part of the sinus (including Remak's ganglion), and a portion of the auricle; the lower part consisted of the post-cava, a small portion of the sinus, part of auricle, and the whole ventricle. Uniting the two were nothing but the isolated septal nerves.

The ventricle in this case does not stand still, but continues to beat in rhythm with the small bit of sinus still joined to it. Removal of the latter at once stops the ventricular beat, although the septal nerves still connected it with the upper part of the heart, which continued to beat normally. The septal nerves were shown by vagous stimulation to be functional, and not injured by the operation.

The second part of the paper takes up the positive side of the function of the septal nerves. It is found: 1. That electrical stimulation of the peripheral stumps of the divided septal nerves has no effect on the rate of the ventricular beat, but does diminish its tone and the force of the beats. 2. That stimulation of the vagus after the operation described in No. 4 above produces the same result as stimulation of the septal nerves. 3. That stimulation of the vagus after cutting the septal still produces inhibition, partial or complete, just as before section, and slight change of tone. The effect on the force of the beat has almost entirely disappeared. 4. Finally, in a heart prepared as in No. 4 above, stimulation of the upper segment produces only changes in the force of the beat; stimulation of the sinus portion of the lower segment, only changes in frequency.

There can be no doubt, when these facts are considered, that the two kinds of fibres contained in the vagus, as first demonstrated by Gaskell and afterward found by Pawlow in the dog, and for whose existence considerable evidence has accumulated, are separated anatomically in the frog, as well as physiologically.

Those fibres which alter the frequency of the beat are entirely excluded from the septal nerves, while those which control the tonus and the force of the ventricle are, for the most part, contained in these nerves.

Gaskell has offered an interesting hypothesis to explain the mode of action of these two kinds of fibres, both of which he

regards as anabolic; but on this point the author offers neither criticism nor suggestion.

On the Action of Certain Substances on the Hearts of *Daphniæ*.—Although each daphnia has an individual cardiac rhythm, J. W. Pickering¹⁷⁸_{v.17,p.356} finds that this remains constant so long as external circumstances are unvaried. *Daphnia* furnishes, therefore, a convenient object on which to study the action of heart-drugs upon hearts where the cardiac nervous system is not highly developed.

It was found that 0.0003 gramme ($\frac{1}{2200}$ grain) of atropine sulphate increases the frequency of the beat for a comparatively long period. A dose of 0.003 gramme ($\frac{1}{32}$ grain) also produced acceleration for a period of twenty to thirty minutes, after which the beats became feeble and irregular and finally ended in diastolic stoppage and loss of irritability.

Muscarine nitrate did not greatly influence the heart even when used in saturated solution. It did act violently on the intestines and destroyed the general irritability of the animal.

Veratrine exhibits its characteristic action, but this depressor action could often be removed by heat.

Theobromine and xanthine had no apparent influence; but caffeine in small doses caused an increase, both in the force and frequency of the beat, while in larger doses it induced pronounced tonic contraction culminating in systolic stoppage.

The Effect of Gravity on the Circulation.—A paper by Hill¹⁷⁸_{v.18,p.16, '96} contains an interesting and very suggestive account of experiments made to determine the influence of gravity on blood-pressure and the distribution of blood in the body. The animals experimented upon were placed upon a holder which could be rotated round an horizontal axis, and the carotid or other vessel used for determining blood-pressure was placed in this axis. Experiments were performed on animals under various conditions, and some of the conclusions to which the author comes are given as follow: 1. The force of gravity must be regarded as a cardinal factor in dealing with the circulation of blood. 2. The important duty of compensating for the simple hydrostatic effects of gravity in changes of position must be ascribed to the splanchnic vasomotor mechanism. 3. The amount of compensation depends largely on individual differences, and is far more complete in animals that stand erect—such as man or monkey—than in dogs, cats, etc. 4. Owing to the completeness of this compensation, gravity has but little disturbing influence in man under normal conditions. 5. If, however, the power of compensation is damaged by paralysis of the splanchnic vaso-constrictors, by injuries to the spinal cord, by

asphyxia, or by some poison such as chloroform or curare, the influence of gravity becomes very marked, and a "feet-down" position may cause the blood to drain into the abdominal veins, empty the heart, and stop the cerebral circulation. 6. These latter consequences may be overcome by placing the animal in an horizontal, or "feet-up," position, and firmly bandaging the abdomen has the same effect. 7. Chloroform rapidly paralyzes the compensatory mechanisms and damages the heart, while ether injures the compensatory mechanism only very slowly and when pushed in enormous amounts. 8. The vasomotor paralysis caused by chloroform may kill the animal by draining blood into the abdominal veins, but its effect may be overcome by elevation or compression of the abdomen; so that compression or elevation of the abdomen, coupled with artificial respiration and with squeezing of the heart through the thoracic walls, is the best means of restoring an animal from a condition of chloroform collapse. 9. In the feet-down position respiration is of the thoracic type; in the feet-up position, of the abdominal type; and these types of respiration tend to compensate for the effects of gravity on the circulation.

Method of Measuring Blood-Pressure upon Man.—Mosso ⁴⁰⁹
V. 53, p. 1, '96 describes a new sphygmomanometer for determining the blood-pressure in man. The instrument is made, after the fashion of a plethysmograph, to take two fingers of each hand. The pressure upon the fingers is then raised until the pulse-tracing attains its greatest amplitude; according to Mosso, this happens when the internal pressure upon the arteries is just counterbalanced by the external pressure. A simpler form of the instrument is described and figured; this form is used with mercury instead of water, and is designed for clinical use. If the instrument prove as convenient and reliable as is claimed, it will undoubtedly be of great service in studying the variations of pressure in man in different conditions of health and disease.

A research with the aid of this instrument has been completed by Colombo,—working under Mosso's direction,—and detailed results are promised shortly. In the present paper Mosso states briefly that this research has given the following results: The position of the body modifies blood-pressure; the maximum pressure obtains in the vertical position and the minimum in the horizontal or reclining position. Blood-pressure is diminished by meals, by sleep, and by heat. Cold baths increase blood-pressure, as do, also, exercise, massage, and coffee. It is curious that massage and coffee raise the blood-pressure to a greater extent than violent gymnastic movements.

On the Effects of the Kneading of Muscles upon the Circulation, Local and General.—T. Lauder Brunton and F. W. Tunnicliffe made their experiments ¹⁷⁸_{v.17, p.364} on the extensor muscles of the leg in cats and dogs, recording the general blood-pressure in the usual way,—by means of a cannula in the carotid,—while the local changes in the muscles themselves were studied by the method invented by Ludwig and his pupils,—Sadlee and Gaskell,—with slight modifications. The venous cannula used was the one made after the pattern of the François-Franck cannula, with a large bulb. This prevented the early formation of clots, on the one hand, and facilitated the removal of any clot which might occur, on the other. The tube by means of which the outflow was measured was horizontal and on a level with the vein. This arrangement obviates the error introduced by measuring the outflow in a vertical tube, as was the custom heretofore, the change in level in the latter necessarily altering the resistance offered to the blood.

On comparing the outflow of blood from this group of muscles before, during, and after massage it appeared, in general, that the flow of blood through the muscles was considerably increased, both during and after kneading.

During massage the advance of the liquid in the tube was not uniform, but occurred in leaps, corresponding, to some extent, to the manipulations. It was also noted that for a brief interval immediately after cessation of massage the flow was much diminished, this diminution, however, being quickly followed by the increased flow; so that ordinarily it does not appear in the results at all. These changes in the outflow indicate that during massage blood is alternately sucked into and expelled from the muscles, and that an accumulation of blood takes place in them by virtue, probably, of a dilatation of the vessels. This dilatation lasts from one to two minutes, or even longer, after the cessation of massage, as evidenced by the increased flow from the efferent vein. The observations on the general blood-pressure during these experiments support the above deductions. The pressure-curve shows, at first, a slight rise, which is followed by a fall, amounting, in some cases, to one-fifth of the initial pressure. The very gradual return to the normal points undoubtedly to a vascular dilatation, and control experiments made by compression of both external iliacs and of the muscles themselves show that one is not dealing here with a mere mechanical compression and relaxation of the larger vascular trunks. The fall in pressure induced by the latter manipulations is less in amount and much more transient in character.

The Vasomotor Nerves of the Penis.—The study of the vasomotor phenomena of the penis has been pursued for some time by

François Franck, ⁴¹⁰_{pp. 122, 138, 196} not alone on account of the immediate interest attaching to these local phenomena and their connection with the process of erection, but especially because this organ furnishes a convenient and easy object on which to work out problems of general interest. Two papers appearing in that journal give some of the results thus far obtained, the experiments having been made on dogs, generally under curare. The first of these papers is chiefly concerned in a description of the methods, including, however, those facts which bear on the subject of erection; the second deals more particularly with the topography of the vasomotor nerves to the penis.

The volume changes of the penis are recorded by a simple form of air-plethysmograph joined to a recording tambour. The usual difficulty of getting an air-tight closure without compression of the afferent and efferent vessels is overcome by the simple device of tying the prepuce itself over the flange on the end of the tube into which the glans and bulb are inserted. With certain precautions indicated by the author, this arrangement works very satisfactorily.

As the volume-curve cannot differentiate between arterial and venous changes, but gives the resultant of their combined effects, simultaneous records are taken of both the arterial and venous pressure in the dorsal vessels of the penis.

For the former a mercury manometer is used and connected with the peripheral end of an artery cut between ligatures. The curve, therefore, indicates the recurrent pressure of the peripheral area, and any fall indicates dilatation; a rise indicates constriction.

The peripheral end of the concomitant vein is connected with a manometer containing sodium-oxalate or sodium-chloride solution, the distal limb being joined to a tambour whose records must be calibrated. The strongly-developed valves in these veins must be destroyed before beginning the experiment, or a T-cannula used if it is desired to obtain the descending as well as the ascending curves. Vaso-dilatation will be indicated by a rise of venous pressure, vaso-constriction by a fall. By the combination of these methods a number of interesting facts are brought out.

Stimulation of any of the dilator nerves to be described below produces three changes: increase in the volume of the penis, a fall of arterial pressure, and a rise of venous pressure. If the phenomenon is not brought on too rapidly the curves distinctly show that the fall of pressure in the arterial manometer (indicating arterial relaxation) precedes both of the other events; the increase of volume is next observed, while the pressure in the veins only appears after a number of seconds. This seems to establish that

the primary and fundamental act in erection consists in an active vaso-dilatation, and not, as has been supposed, in the resistance to the venous outflow. The latter is essential, however, to complete the act, and, among other things concerned in blocking the veins, the author has evidence to show that certain extrinsic muscles of the penis, reflexly thrown into contraction by the distension of the organ, play an important part. The co-operation of the intrinsic muscles is not denied.

The curves also bring out the fact that the latent period of the vaso-dilators is always much longer than that of the vaso-constrictors. The former, in fact, was found to vary from 0.5 second to several seconds, and depended apparently on a number of things, such as intensity of stimulus and condition of the nerve, but chiefly on the state of the blood-vessels before stimulation.

As to the course and function of the vaso-motor nerves of the penis, a number of important discoveries are recorded. Taking as a safe index of an active arterial dilatation simultaneous increase of volume of the penis and fall of recurrent arterial pressure, while general arterial pressure remains constant, vaso-dilator fibres are found not only in the *nervi erigentes*, but in a number of other nerve-trunks not suspected hitherto of possessing such fibres. These fibres are traced by the author from the third and fourth lumbar sympathetic ganglia to the inferior mesenteric ganglion. From here they pass in the descending branches to the hypogastric plexus, all of whose numerous efferent branches to the penis contained vaso-dilator fibres. Certain anastomosing branches between the hypogastric plexus and the internal pudic nerves were also found to transmit some of these efferent dilator fibres, which thus reached the penis by a circuitous route. Above the union with these branches the internal pudics contain only vaso-constrictors; but below their junction, under certain conditions, they may, on stimulation, give vaso-dilatation. The number of fibres taking this course is probably small, as cutting both internal pudic nerves after leaving the pelvis does not perceptibly diminish the result following stimulation of the descending branches of the inferior mesenteric ganglion or a dilatation of central or reflex origin.

The vaso-constrictor fibres enjoy an equally wide distribution, occurring, in fact, in all the trunks described as containing dilator fibres except the posterior nerve of Eckhard, which is a pure dilator nerve. They occur, therefore, in the lumbar region of the sympathetic chain, the lateral radicles of the inferior mesenteric ganglion, the descending branches of the latter to the hypogastric plexus, in numerous efferent filaments from the latter, even in

those already described as anastomosing with the internal pudic nerves. According to the character of the stimulus, its strength and rhythm, these filaments may give vaso-constriction or vasodilatation. The internal pudic nerves themselves, considered since the time of Eckhard as sensory nerves, are rich in centrifugal vaso-constrictors; and, finally, the anterior nerves of Eckhard, before their union with the posterior to form a common trunk, are found to contain vaso-constrictors, which must be present in the united trunk, but are always concealed by the predominance of the dilator fibres. The vaso-constrictors of the anterior nerves of Eckhard are traced to the upper part of the sacral region of the sympathetic chain, from which a very constant anastomotic branch has been described passing to the first sacral nerve.

Influence of Respiration on the Venous Circulation of the Posterior Extremities.—The experiments of E. Wertheimer⁴¹⁰_{p.107,95} consist in taking simultaneous records of the pressure in one of the veins of the leg (femoral, crural, saphena) and of the respiratory movements, using dogs under the influence of morphia, except in a few instances where the anæsthetic was omitted for the purpose of control.

The records show a distinct rhythmic oscillation of venous pressure synchronous with the respiratory movements. With each inspiration there is a fall of pressure amounting to from five to twenty millimetres (the manometer containing Na_2CO_3 solution of 1080 specific gravity); with each expiration a return to normal.

These pressure changes are not caused by the simultaneous variations of the cardiac rhythm, because they may be pronounced when, from natural causes or after administration of atropine, the heart-beat remains perfectly uniform. The inspiratory fall of pressure is increased also by any manipulation that increases the aspiration of the thorax, such as partial closure of the tracheal cannula. Under such conditions it may amount to as much as forty millimetres.

Poiseville had obtained practically the same result, but misinterpreted the facts. Observing that the pressure changes disappeared on widely opening the abdomen, he ascribed the expiratory rise to a compression of the abdominal viscera by the abdominal muscles during expiration. That this is not the correct explanation is easily apparent from a number of facts: 1. The same changes are observed on veins of the anterior extremities. 2. After a prolonged pause in respiration, the first pressure change occurring in the vein is always an inspiratory fall, which, according to Poiseville, could only follow upon a previous expiratory rise of pressure.

Opening the abdomen produces the result indicated simply by interfering to such an extent with the respiratory mechanism that the aspiration of the thorax is too slight to make itself felt in the femoral vein.

The conclusion reached is that, of the two opposing factors coming into play in inspiration, increased intra-abdominal pressure tending to raise venous pressure on the one hand, increased aspiration of thorax tending to lower venous pressure on the other, the latter is, as a rule, the more efficient and the pressure falls; and not only does this apply to the femoral vein, but to a lesser extent is it true of the more distant veins, such as the saphena, as low down as the tendo Achillis.

Only in rare and exceptional cases was a slight preponderance of the abdominal pressure observed. However, it is possible to reverse the ordinary course of events by cutting both pneumogastric nerves. After this operation the venous pressure rose during inspiration and fell in expiration. After the administration of chloroform the same thing is frequently observed, and the author inclines to explain the result in both cases by the spasmodic character of the contractions of the diaphragm.

On Variations of Venous Pressure.—Of the various methods which have been devised for determining local vascular changes, the one which has enjoyed most extensive application is that based on the measurement of the volume of the organ concerned. A more recent method, of less technical difficulty, has been suggested—namely, that of measuring the pressure in the efferent vein of the area to be examined. Rise of venous pressure indicates dilatation of the small vessels; fall of venous pressure, vascular constriction.

C. Delezenne,⁴¹⁰_{p.170, '96} gives an account of two series of experiments, whose value lies partly in their confirmation of the results of others, partly in supplying further evidence in favor of the second method.

In the first series simultaneous records are taken of the volume of one kidney and of the venous pressure of the other in the same animal. Various influences—including stimulation of sensory nerves, cooling the skin, asphyxia, and strychnine—which are known to bring about constriction of the renal vessels caused the usual shrinkage in the size of the kidney. The curve of venous pressure ran exactly parallel to the volume curve.

A second series of experiments was then instituted, in which simultaneous tracings of the pressure in a large artery, renal vein, and femoral vein were taken for the purpose of comparing the vascular changes of an abdominal organ (kidney) with those of

the skin and muscles of one of the limbs. The results are in complete accord with those of Heidenhain and Grützner, Wertheimer, Dastre and Morat, and others. The records clearly show a rise of pressure in the femoral vein for every fall in the renal vein, indicating directly opposite changes in the vascular areas drained under the influence of the various stimuli mentioned in the first series.

In the preceding paper C. Delezenne⁴¹⁰_{p.170,'93} showed that peripheral (vasomotor) changes which cause a rise of arterial pressure lead to a diminution of the volume of the kidney and a fall of pressure in the renal vein while the pressure in the femoral vein rises; on the contrary, a fall of arterial pressure from peripheral causes is accompanied by an increase of kidney-volume and pressure in the renal vein and by a diminution of pressure in the femoral vein.

Delezenne⁴¹⁰_{p.315,'93} now takes up the effects of changes which are central in origin, due to altered functional states of the heart and lungs. Taking curarized dogs, a fall of arterial blood-pressure is obtained by stimulating the peripheral end of the vagus in the neck, or by distending the lungs and holding them in the phase of strong inspiration. In either case it is found that the volume of the kidney diminishes and the pressure in the renal and femoral veins rises.

On the contrary, when the artificial respiration is interrupted for a short time (it is started up again before asphyxial changes show themselves), in order to allow the lungs to come to rest in expiration, a rise of arterial pressure from purely mechanical causes is observed. This rise is accompanied by an increase in the volume of the kidney, while the pressure in the renal and femoral veins, again changing in the same direction, sinks.

The results of both papers are tabulated by the author as follows. Designating the arterial pressure by PA , the volume of the kidney by VR , and the pressure in the renal vein by PR , it was found that

	PA	VR	PR
Peripheral causes	{ $\begin{array}{c} + \\ - \end{array}$	| $\begin{array}{c} - \\ + \end{array}$	| $\begin{array}{c} - \\ + \end{array}$
Central causes	{ $\begin{array}{c} + \\ - \end{array}$	| $\begin{array}{c} + \\ - \end{array}$	| $\begin{array}{c} - \\ + \end{array}$

Finally, in those cases of peripheral changes studied in the first paper the pressure in the femoral vein always changes in the opposite direction from the change in the renal vein; while central changes always produce variations in the same direction in the two veins.

On the Innervation of the Thoracic Duct.—L. Camus and E. Gley⁴¹⁰_{p.454,94} (see ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES, vol. v, I-4, 1895), having demonstrated the existence of dilator nerve-fibres for the receptaculum chyli in the splanchnic nerve of the dog, now⁴¹⁰_{p.301,95} extend their observations to the thoracic duct. Still using dogs, they avail themselves of a slightly-modified form of the method devised by Morat and Doyon to study the movements of the bile-ducts. The method is based on the fact that, when an indifferent liquid is forced through a duct of any kind under a constant pressure, the rate of flow will vary directly as the calibre of that vessel; that is to say, increased rapidity of flow indicates a dilatation, retardation signifies constriction.

A direct effect upon the thoracic duct was demonstrated only for the thoracic sympathetic nerve-trunk; but it was also shown that this vessel could be influenced reflexly by a number of different nerves.

When the sympathetic chain is divided just below the stellate ganglion and the thoracic portion stimulated, the usual effect is a dilatation of the thoracic duct. The amount of dilatation and also its duration increase with the intensity of the stimulus. Sometimes, however, the opposite effect occurs; the outflow is diminished and the duct constricted. The authors conclude that this nerve-trunk supplies the duct with both dilator and constrictor fibres, but that the former are either more numerous or more excitable, and hence the preponderance of the dilating effect. This relation of the sympathetic to the thoracic duct agrees exactly with that of the splanchnics to the receptaculum; for, while the authors described only the dilator effect in their former communication (*loc. cit.*), they have since succeeded, in a few cases, in obtaining a constriction of the receptaculum also on stimulation of the splanchnic nerve.

The reflex movements of the thoracic duct were obtained from the peripheral stump of the vagus divided below the heart, from the peripheral end of the divided splanchnic, and from the sciatic nerve.

The vagus gave reflex constriction and, therefore, a diminution of the outflow. The path of the afferent impulses, being probably the same as when reflex effects on respiration, on blood-pressure, and on the pupils are obtained from this portion of the vagus, may run either in the vagus of the opposite side or in some anastomotic branch to the sympathetic chain.

The splanchnic, on the contrary, produced a marked acceleration of the outflow, persisting for some time after the stimulus is taken off, and this in spite of a simultaneous rise of venous press-

ure in the jugular vein which might, *a priori*, be expected, under the conditions of the experiment, to lead to a retardation.

Tying the sciatic nerve caused alternate slowing and quickening of the flow, which had been going on at a perfectly uniform rate. Stimulating the central end of the divided nerve gives acceleration of flow or, in other words, relaxation.

The medulla having been cut in these dogs, the centres for these reflexes are supposed to lie somewhere in the spinal cord. Their definite location and the precise course of the efferent fibres out from the cord the authors hope to determine in a further series of experiments.

Influence of Asphyxia on the Contractility of the Thoracic Duct.—L. Camus and E. Gley,⁴¹⁰_{pp.301-328, '96} after having obtained evidence for the existence of centres of origin in the spinal cord of efferent nerves to the thoracic duct, took up the interesting question as to whether asphyxia had any influence on the lymph-vessels, and, if so, in what manner,—especially as it is known that the nerve-centres, above all other tissues, are stimulated by venous blood.

Still using the same methods as before, they study the effect of asphyxia on the thoracic duct and on the receptaculum chyli. For the duct, it is found that the flow begins to diminish thirty to fifty seconds after the suspension of respiration and may go on diminishing to the point of complete stoppage. If the asphyxia has not been maintained too long, the flow begins immediately on starting up respiration. But, if maintained for a longer time, the retardation gives place to an acceleration, which, in turn, is followed by complete cessation of the flow, in case the respiration is not started up. This second arrest is definitive, and is brought about by the gradually-rising venous pressure reaching a point where it equals the pressure in the apparatus which drives the liquid through the thoracic duct. [This, by the way, never exceeded six to seven centimetres.]

The primary slowing up and the subsequent acceleration of the flow are, however, taken to indicate changes of calibre in the duct. Asphyxia causes contraction or constriction of the thoracic duct just as it does in other hollow viscera; the same statement holds true for the receptaculum chyli, as shown by direct experiment. In the latter the contraction was found to begin fifteen seconds after the cessation of respiration, commencing slowly and lasting a long time.

The influence of asphyxia on the thoracic duct is not affected by section of the sympathetic chain just below the stellate ganglion. This fact, taken in connection with what was said above regard-

ing the peculiar susceptibility of nerve-centres to a venous condition of the blood, indicates that some of these constrictor fibres to the thoracic duct must arise from the cord below the point of origin of those fibres which pass to the first thoracic ganglion. The particular rami communicantes containing these nerve-fibres have not yet been worked out.

Respiration.

Toxicity of Asphyxiated Blood.—Ottolevghi⁴⁰⁹_{v.23,p.117,'96} attempts to determine the toxicity of blood taken from an asphyxiated animal. Rabbits were chosen, and after one of them had been asphyxiated by slow suffocation specimens of its blood were taken with due precautions and injected into normal animals. Blood from animals killed suddenly was used as a control. The general result was that the asphyxiated blood was distinctly more toxic than normal blood, and the author suggests that this may be due to leucomaines formed in the tissues during asphyxiation.

Poisonous Action of Carbon Monoxide Gas.—Carbon monoxide gas, even in small quantities, is known to produce death with mice, which appear to be especially sensitive to its action. Haldane¹⁷⁸_{v.18,p.201,'96} finds that so little as 0.06 per cent. produces distinct symptoms. In a number of interesting experiments made upon this animal he shows that the carbon monoxide is less poisonous the higher the tension of oxygen in the atmosphere breathed, and if the pressure of oxygen is increased to two atmospheres the carbon monoxide is no longer fatal, not even when the amount was pushed to nearly an atmosphere. Control experiments showed that in an atmosphere of this kind, with a high pressure of oxygen and a large percentage of CO, the red corpuscles combine readily with the CO, and the value of the high tension of O in preventing the poisonous effect of the CO does not lie in the fact that it prevents the combination of the CO with hæmoglobin. Haldane's explanation is that at a pressure of two atmospheres of oxygen enough of this gas is dissolved in the plasma under high tension to support respiration without the aid of the red corpuscles, the latter being completely thrown out of function by the CO. This latter gas is not directly poisonous to the tissues, its injurious effect being confined entirely to its action on the red corpuscles. Insects placed in an atmosphere containing 80 per cent. of CO are not affected, while in an atmosphere of 80 per cent. of CO₂ they quickly die.

Relative Respiratory Activity of Brain and Muscle during Rest and Activity.—Hill and Nabarro¹⁷⁸_{v.18,p.218,'96} have collected samples of arterial blood from the carotid artery, femoral vein, and cerebral veins (torcular Herophili), and determined the O and CO₂ when the

animal was at rest and during the tonic and clonic spasms produced by excitation of the cortex or by the action of absinthe. The samples of blood were collected simultaneously and it was supposed that the relative O and CO₂ contents of the femoral and cerebral venous blood, as compared with the carotid blood, would indicate the relative extent of chemical activity in the muscles of the leg and the cortical substance of the brain. It was found that during rest the metabolism of the brain is quite low as compared with the muscles, and that this difference is much increased during epileptic convulsions. For example:—

		Normal.	Tonic.	Clonic.
Carbonic acid,	{ Torcular,	+ 3.87	+ 4.06	+ 2.99
	{ F. vein,	+ 8.76	+ 13.90	+ 19.33
- Oxygen,	{ Torcular,	— 3.42	— 4.95	— 4.31
	{ F. vein,	— 12.92	— 13.75	— 12.63

The figures give the difference between the O and CO₂ in the carotid artery and the torcular and femoral vein, respectively. The authors think that their results oppose the general results recently obtained by Mosso from thermometrical measurements of the temperature of the brain and of the blood. According to Mosso, the temperature of the brain may be higher than that of the blood, and he attributes to the brain a metabolic activity similar in extent to that possessed by muscles, believing that its heat-production is a more important factor than has been supposed hitherto.

The Pulmonary Fibres of the Vagus.—Boruttan²⁴⁶_{v. 61, p. 39} experimented upon the effect on the breathing movements of stimulation of the vagus and the results of bilateral section of the vagus on the respirations and on the condition of the lungs. With reference to the effects of stimulation of the vagus he finds that mechanical, chemical, and thermal stimuli give usually an expiratory effect, but that momentary stimulation—such as the quick stroke of a mechanical tetanometer or the cutting of the nerve with sharp scissors—may give an inspiratory effect. With a constant current an ascending direction gave expiratory effects lasting during the passage of the current, while a descending current might be without effect, but usually gave an inspiratory effect at the moment of closing the current. When the currents were broken a reverse effect might be obtained, the opening of the ascending current giving an inspiratory effect, while the opening of the descending current gave an expiratory effect. Experiments with unipolar stimulation showed that the stimulus in all cases proceeded from the cathode, and the difference in effect between the ascending and descending currents the author explains on the supposition that the electric disturbance proceeding from the

cathode at the moment of closing the current causes inspiratory effects, but that the catelectrotonic current, extra-polar to the cathode, causes expiratory effects. This latter, in the ascending current, works throughout the continuation of the stimulation, but in the descending current its effect is blocked by the anode, while the negative wave arising from the cathode at the moment of closing gets through, or may get through, before the establishment of anelectrotonus.

It is well to observe that the author's experiments were made upon non-narcotized animals; they seem to explain the divergent results obtained by other investigators using different forms of stimulation.

Digestion, Nutrition, and Heat-Regulation.

On the Complete Extirpation of the Stomach.—The experiments on stomach extirpation in the dog, published by J. Carvallo and V. Pachon in 1894 (*ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES*, vol. v, 1-17, 1895), are now supplemented by a similar experiment on the cat.⁴¹⁰_{p.349, '95} The anatomical relations in this animal are such that complete ablation of the organ is possible,—a thing which has not yet been accomplished in the dog, where a small portion of the cardia remains behind.

The results are very similar to those obtained on dogs. In the course of three months the weight of the cat actually increased, showing that there was no impairment of general nutrition. The diet during this time was chiefly liquid,—a broth made of milk, rice-flour, and yolks of eggs being supplemented by pure boiled milk. On this diet the feces were pale-yellow in color and of a firm, healthy consistency. Small pieces of cooked meat or of cheese, as well as of potato-soup, are all equally well digested. As in the operated dogs, so here it is found that raw meat is less perfectly digested than cooked meat; three and a half months after the operation the cat still refused small pieces of fresh lung, of which normal cats are particularly fond.

While the cat scarcely ever vomits after removal of the stomach, it does manifest the same condition of general fatigue or lassitude noticed in dogs. This sluggishness at meals may reach such a point as to reduce the amount of voluntarily eaten food below the requirements of the animal. This condition seemed, however, to be disappearing since the end of the second month.

The chief point made in the paper is that in this animal, in which the stomach was removed completely for the first time, each of the three main alimentary principles can still be digested as completely as in a normal cat.

An Experimental Study of Direct and Indirect Faradization of the Digestive Canal.—The experiments of Meltzer,¹ June 15, '95 made on dogs, cats, and rabbits, prove that in these animals, at least, the ordinary methods employed in the electrical treatment of the stomach and intestine are incapable of producing contraction in the muscular coats of the digestive tract. These methods are two in number,—the “percutaneous,” in which both electrodes are placed outside on the abdominal wall, and the “direct,” in which one electrode is applied to a selected place on the abdominal wall, the other introduced either into the rectum or into the stomach. Neither of these arrangements were found ever to start a contraction, local or peristaltic, no matter how great the strength of the stimulus.

When both electrodes are applied to the serous surface of the intestines or stomach marked contractions are obtained, except in the region of the fundus of the stomach. The latter is nearly incontractile; a strong and long stimulation produces a hardly-perceptible effect. In all other parts the contraction increases with the strength of the stimulus until it becomes maximal; it is generally local in character, unless peristalsis was going on before electrization, in which case the local contraction sometimes caused the spreading of a new peristaltic wave. At the pylorus, in fact, a local stimulation practically always brings on a wave-like contraction of this entire part.

Contractions can also be obtained by placing both electrodes on the mucous surface of the stomach or intestines, but much stronger stimuli are required. In the stomach, for example, a stimulus which, on the outer surface, gave a maximal contraction, had no effect at all when placed on the corresponding points inside the stomach. It had to be increased considerably to produce a contraction at all. The result is ascribed to the great resistance offered by the mucous membrane; so that the current, which actually penetrates to the muscular coat, is comparatively weak, and hence the slight effect.

When one electrode is placed inside the stomach and the other is brought on the serous surface, the stomach contracts when the distance between the two is less than two centimetres. But the simple interpolation of a strip of omentum and still more of the abdominal wall between the outer electrode and the stomach put an end to all contraction. In the intestines the case is a little different; in them, when one electrode is on the outer surface and the other is applied to the mucous membrane of even a distant part, there occurred always a contraction of the part where the outer electrode rested. In fact, this contraction at the outer elec-

trode is seen even when the inner electrode is in the stomach; and, on the contrary, when the outer electrode is on the surface of the stomach while the inner rests against the mucous membrane of the intestine, the former contracts.

Mucous membranes which cover striated muscular tissue, such as those of the mouth, pharynx, and upper portion of the œsophagus, do not form an obstacle to the current; in these localities the underlying muscles contract as vigorously as though they were uncovered. The difference in the result is not explained by the difference in the excitability of the two kinds of muscular fibre. When the mucous membrane of the tongue is replaced by a piece of the mucous membrane of the stomach, faradization no longer produces contraction of the tongue-muscles. The character of the mucous membrane evidently plays an important part in determining the effect in any case. The nature and extent of these differences the author reserves for a future investigation.

The Glycolytic Power of the Blood and Tissues.—W. Spitzer, ²⁴⁶_{r. 60, p. 300} in a paper in which he attempts to give a deeper insight into the nature of glycolysis, begins with a statement of the facts which most investigators have agreed on. At the same time, the author's own experiments, added by way of corroboration, occasionally necessitate slight modifications or a further extension of accepted views. The facts are, briefly, these: Glycolysis goes on in oxalated blood, in defibrinated blood, and in laky blood with the same intensity as in fresh arterial blood; it follows, therefore, that the destruction of the grape-sugar depends neither on the presence of the fibrin-factors, on the association of the hæmoglobin with the stroma of the red corpuscles, nor on the act of clotting.

It has also been quite satisfactorily shown that neither blood-serum, the blood-proteids, nor methæmoglobin, which might arise in blood kept for the purpose of studying glycolysis, are connected with the phenomenon. Glycolysis is, therefore, a function of the formed elements of the blood. The active constituents of the corpuscles are partially soluble in 0.6-per-cent. NaCl solution; but repeated extraction still leaves behind some of the active bodies which are insoluble in this reagent. The fact that an active extract is obtained from the fresh cell by means of NaCl solution is sufficient to indicate that glycolysis has nothing to do with their vital activity; in fact, the author shows that the dried alcoholic precipitate of blood furnishes an active aqueous extract.

What has been said of the blood-cells is also true of the tissue-elements in general, although their extracts are, on the whole, less intense in their glycolytic power. The second part of

the paper deals with the nature of the process and the conditions which influence its intensity.

The first point made is that glycolysis is an act of oxidation. The evidence for this is based on two observations; Kraus showed that O is absorbed and CO₂ liberated in the act, while the author finds that complete removal of the O inhibits the phenomenon altogether. This is not surprising in view of the fact that the blood and dead animal tissues, as well as their aqueous extracts, have been shown to cause oxidation in other chemical substances such as salicylic and formic aldehydes, which are changed into their corresponding acids. As strongly-oxidizing agents are not known to occur in cellular structures, recourse is usually had to ferments to explain both reactions,—the oxidation of the grape-sugar and the oxidation of the aldehydes. The author, on the other hand, advances the hypothesis that these oxidations are of the nature of “catalytic oxidations,” which possess a certain similarity to ferment action, and which have been utilized by certain physiologists to explain oxidation processes in living organisms. In the latter it is generally admitted that the O molecule is in some way rendered “active” by being split into its constituent atoms. While Hoppe-Seyler would have this accomplished by easily combustible substances arising in the cells in the course of their metabolism, which by appropriating one atom of O liberate the other atom and enable it to attack more difficultly oxidizable bodies, Traube assumes the existence of a so-called O ferment which, though small in amount, can transfer in a given time large quantities of O without itself being oxidized. The blood and tissue extracts are experimentally shown not to contain reducing substances; Hoppe-Seyler’s theory cannot, therefore, be made available to explain the oxidations taking place in these.

On the other hand, it is known that many inorganic substances such as palladium, platinum sponge, oxides of copper, etc., also some organic compounds, do bring about oxidations which molecular oxygen cannot effect. An example of the latter is found in indigo-white; when this is present in a solution containing glucose it alternately takes up atmospheric O, is changed to indigo, while this, in turn, gives the oxygen up to the grape-sugar and is once more converted back into indigo-white, etc. Substances which possess the property of setting free atomic oxygen from the ordinary molecular condition or from compounds rich in oxygen, the author calls *sauerstoffreger*, or “oxygen excitors.”

The earlier work of Schönbein and Schmidt has demonstrated the existence of O excitors in various plant and animal cells. These tests are usually made with H₂O₂, as being most convenient;

taking the same reagent for his tests, the author succeeds in demonstrating a perfect parallelism between the ability of the blood and tissues to catalyze H_2O_2 and their glycolytic function. Both powers are permanently destroyed by boiling, by strong acids and alkalies; serum is not glycolytic; likewise is it unable to split up H_2O_2 to produce atomic oxygen, etc. Finally, a number of interesting observations are cited from the work of Schönbein, Pfeffer, Schmidt, and Würster to show that substances are present in dead tissues which are not only able to decompose H_2O_2 , but which can also split atmospheric oxygen and change it into active oxygen, thus accomplishing oxidations which ordinary passive oxygen would be unable to bring about. The author multiplies these experiments by some of his own, and so, having demonstrated the existence of O excitors in the blood and tissues, he concludes that the oxidation of dextrose, of the salicylic aldehyde, etc., is to be explained by the action of these bodies.

This is, perhaps, the chief point which the author attempts to bring out; the remainder of the paper is devoted chiefly to a study of some of the conditions which affect the result. Not only will the intensity of the oxidation process vary with each particular O excitor, of which, of course, there are many different kinds, and with the temperature and reaction of the medium, but it will also be affected by the character of two other factors concerned in the act,—namely, the affinity for O of the body to be oxidized and the firmness with which the O is held in the compound furnishing this element. This, by the way, need not of necessity be furnished by molecular oxygen, but may, in the absence of free oxygen, be split off from some O-containing molecule like H_2O_2 , KClO_3 , etc. It should be pointed out that these researches simply prove that dextrose can be oxidized in the presence of molecular oxygen through the mediation of these oxygen excitors. Whether the oxidation of sugar in the living body is accomplished in the same way is left entirely open.

On the Response of the Chick, Before and After Hatching, to Changes of External Temperature.—M. S. Pembrey, W. H. Gordon, and R. Warren¹⁷⁸_{p.331} have contributed a paper in which the respiratory exchanges of mature and immature chicks were determined by means of Haldane's apparatus, slightly modified to suit the conditions of the experiment, and which forms a part of a research upon the power in virtue of which warm-blooded animals are able to vary their production of heat according to the varying temperature of their surroundings.

Taking the CO_2 given off in a given interval as a measure of the heat produced during the same, it is found that chick em-

bryos up to about the twentieth day of incubation behave like cold-blooded animals, the CO_2 production rising and falling with the external temperature. The delay in the response of the embryos appearing in the records of the experiments is demonstrated by actual tests on eggs to be entirely due to the time required in taking on the new temperature of the medium which is changed suddenly.

Newly-hatched chicks, on the contrary, behave like any warm-blooded animal; so that, for example, a fall of 20°C . (36°F .) in external temperature will within fifteen minutes raise the carbonic acid to double its previous amount.

Toward the end of incubation, about the twentieth and twenty-first days, there is an intermediate condition which seems to be specially interesting and which the authors promise to investigate more fully. At this time no marked response is obtained to changes of external temperature. This apparently neutral stage may be the resultant of two opposite tendencies as manifested in the earlier embryo, on the one hand, and in the chick, on the other hand.

As the chick, when exposed to cold responds by active muscular movements, the author conjectures that the power of regulating the production of heat depends upon the integrity and full development of the nervous control of muscular action.

Ductless Glands.

Connection of the Spleen with Blood-formation.—Landenbach records ²⁶⁵_{v.9,p.1} some interesting experiments which seem to give positive evidence in favor of the view that the spleen is connected in some way with the formation of red corpuscles. His experiments were made upon dogs from which the spleen was removed, followed by observations upon the amount of hæmoglobin and the number of red corpuscles. These latter observations were continued after removal of the spleen, during a time varying from two months to two years. During the first days or weeks after the operation no perceptible alteration in the blood could be detected, but subsequently, after the lapse of two to three months, there was a marked diminution in the amount of hæmoglobin and the number of red corpuscles. The animals, as a rule, bore the operation well and made a good recovery, but showed always a diminished power of producing red corpuscles; so that after a hæmorrhage regeneration of corpuscles and hæmoglobin was much prolonged as compared with the normal animal. When the animal survived the blood-alterations gradually disappeared, and this, together with the fact of their tardy appearance after the operation, induces the

author to believe that there exist in the body mechanisms which can replace the function normally fulfilled by the spleen. He was not able to show, however, any increased hæmatopoietic power on the part of any organ except the bone-marrow. The very late appearance of the blood-changes after splenectomy is remarkable and does not appear to the reviewer to be fully explained by the assumption of the author that the function is at once vicariously assumed by some other organ.

Influence of Age on the Result of Splenectomy.—Sabbatani calls attention ⁴⁰⁹_{v.29,p.155,96} to the fact that in rats, at least, splenectomy is not fatal if young animals are used, but in the case of old animals death results in from four to seven days after the operation. The predominant symptom in the fatal cases is a profound anæmia, together with hæmoglobinuria, thus indicating some connection between the spleen and the hæmatopoietic function. From the few experiments made by the author this effect of age is not seen in other animals—dogs, for example—in which splenectomy is usually a harmless operation. No satisfactory explanation is given of the cause of the fact that in rats the operation is fatal or harmless according to the age of the animal.

Physiology of the Suprarenal Glands.—Oliver and Schäfer ¹⁷⁸_{v.18,p.230} give an account of some very interesting experiments made with extracts of the suprarenals. The extracts were made with water, alcohol, and glycerin. The alcohol extracts, when made with absolute alcohol and upon the perfectly dehydrated glands, were ineffective. Aqueous extracts, even in minute doses, gave remarkable effects upon the circulatory system of the animals into which they were injected. The blood-pressure increased rapidly, giving a steep rise to the kymograph-curve and showing that there had been a strong constriction of the small arteries. From plethysmographic observations made upon the limbs and the spleen the authors are led to believe that the great vascular constriction produced occurs chiefly in the splanchnic area. In opposition to previous statements by Szymonowicz and Cybulski, they show that the extract acts directly upon the muscles of the blood-vessels, since it occurs equally well after section of the cord or division of the nerves supplying the limbs. The rise of blood-pressure is more marked if the vagi have been cut previously, since the strong constriction of the arterioles produces a reflex inhibition of the heart, which tends to lower the pressure. Upon the heart itself, after removal of the inhibitory fibres by section or by the use of atropine, the extracts produce an acceleration and augmentation. The extracts in the case of rabbits usually proved fatal even in very small doses. The active principle in the extracts responsible

for the very marked effects upon the muscles of the blood-vessels and heart was not isolated, but it was shown that it is not neurin, as has been asserted, since neurin has a different effect upon the vascular system. It was shown, moreover, that this active principle exists exclusively or mainly in the medulla of the gland; that boiling the extracts does not destroy this principle unless the boiling is prolonged; that the active principle is not injured by drying, but it is destroyed by the action of alkalies. Removal of the adrenals, on the other hand, is followed by extreme muscular weakness and loss of vascular tone. They conclude, therefore, that normally these glands produce something which is added to the blood and which aids in maintaining tone in the different kinds of muscular tissue.

Excretion.

Function of the Kidney and Action of Diuretics.—Sobieranski²⁷³_{v.35,p.144} repeats the experiments of Heidenhain upon the secretion of indigo-carmin by the kidney, and shows that, under some circumstances, the glomerular epithelium is stained, as well as that of the convoluted tubules. Similar results were obtained with carmine solutions, the secretion being mainly through the glomerulus. When the secretion was weak the epithelial cells of the convoluted tubes were stained only superficially; but with stronger secretion the coloring might penetrate into the basal part of these cells,—a fact which the author interprets to mean that the function of these cells is to absorb rather than to secrete. Injection of caffeine caused marked diuresis, but injection of caffeine followed by indigo-carmin gave less coloration of the epithelial cells of the convoluted tubules than in animals without the caffeine. Sobieranski contends that the opposite result should have been obtained if caffeine act by stimulating the epithelial cells to greater secretory activity. His own view is that the diuretic action of caffeine is due to its paralyzing the absorptive power of the cells of the convoluted tubules. Exactly similar results were obtained with diuretin.

Muscle and Nerve.

Physiological Effects of Galvanic Currents of the Same Strength, but of Different Tension.—Since the strength of a galvanic current is given by the formula $\frac{E}{R}$, it is evident that this will remain constant as long as E and R are varied together. In other words, a current of any given strength may be obtained from sources of very different electro-motive force (*i.e.*, have different tensions) by adjusting the resistance of the circuit. Physically such currents

are generally considered equivalent and produce the same result when measured in terms of the water decomposed per unit of time or in any other way.

Whether they are similarly equivalent in their physiological effects upon muscle and nerve seems to be a matter of controversy, and Denis Courtade,⁴¹⁰_{p.27,76} undertakes to investigate the subject upon the frog, using the sciatic nerve and the gastrocnemius muscle. His method consists in finding a current giving a minimal contraction when there is no resistance in the circuit, and then noting the effect on the contraction of increasing the tension of the current and the resistance at the same time, in such a way as to keep the strength of the current constant. He finds that, for the muscle, the contraction does not vary so long as the strength of the current remains the same. For the nerve, on the contrary, the contraction increases with the tension of the current; so that the effect may be six times as great with powerful resistance as it was with no resistance in the circuit, although the strength of the current, as measured by the galvanometer, remains unchanged. This is strictly true of the positive pole only; with the negative pole the nerve, in some cases, behaves exactly as the muscle.

To explain his results the author makes use of two facts. In the first place, he calls attention to the difference in the reaction of muscle and nerve according to the form of the electrical wave, as demonstrated by d'Arsonval. The muscle, according to the latter, is most sensitive to the quantity of electricity, and the energy of the contraction depends much less on the difference of potential; in nerves it is chiefly the latter which determines the strength of the stimulus. In the second place, certain facts are adduced which make it appear probable that, with the high-tension currents, the difference of potential in the nerve does increase. In a metallic conductor consisting of a series of resistances the electro-motive force, applied at the extremities, distributes itself over the conductor proportionally to the resistances of its several parts. On adding an additional section and increasing the potential in proportion the original sections are not at all affected and the difference of potential for each remains the same. The author shows that this is not the case for electrolytes. On passing a current of 2 volts through acidulated water having a resistance of 200 ohms decomposition took place with deflection of 100 degrees in the galvanometer. An additional resistance of 800 ohms is introduced, and the galvanometer returns to 20 degrees. If the difference of 2 volts were now distributed in proportion to the resistances, the water would receive only 0.4 volt. But the

decomposition still going on indicates that it receives at least 1.49 volts.

If one assume that something similar occurs in the nerve, it at once becomes clear why it responds more strongly to a current when of high tension than to the same current of lower tension, and the muscle does not, since the quantity of electricity remains the same, while the difference of potential is altered. But, as d'Arsonval showed, the muscle is more or less indifferent to the latter, while the nerve is quite sensitive to it.

The Time Relations of the Voluntary Tetanus in Man.—The larger portion of a paper by D. F. Harris¹⁷⁸_{v.17,p.315} is taken up with the description of methods and a statement of detailed results which do not admit of any brief summarization. To the working physiologist, however, it is valuable as an illustration of how apparatus may be applied to new uses by skillful combinations. The problem was investigated by no less than nine methods, and, while some proved fruitless, the results obtained from the rest were sufficiently uniform to establish the following conclusions: (1) in the adult human being the voluntary tetanus is an "incomplete" tetanus, there being on an average 12.5 contractions per second, the minimum rate being 6 and the maximum 18 per second; (2) in the majority of instances the tracing of the voluntary tetanus is more distinctly wavy at the beginning than at the end of continued contraction, while at the same time the average rate of the tetanus is higher; (3) there is also some evidence to support the statement that the average rate of single voluntary muscular twitches is 10 or 11 per second,—in other words, the average rate of emission of stimuli from the cells of the anterior horn is 10 to 12 per second, whether these stimuli are to produce at that rate individual "twitches" of the entire muscle or are to be directed in such a manner that the individual contractions are summated in a discontinuous fashion, resulting in an "incomplete" tetanus on the graphic record.

Central Nervous System.

Psychical Phenomena and the Temperature of the Brain.—Mosso delivered the Croonian lecture on the above topic before the Royal Society of London in 1892. The temperature of the brain was determined by delicate, specially-constructed thermometers, capable of indicating 0.002° C. These thermometers were inserted into a trephine-hole, so as to lie in contact with the cerebrum or to penetrate it. Similar thermometers were placed in the carotid artery and the rectum, to obtain simultaneous temperatures at these places. Charts are given to show the temperature

of brain, blood, and rectum when the animal was narcotized by laudanum, when under chloroform followed by laudanum, and when under chloral. The effect of sensory excitation, as well as of direct stimulation of the psychomotor region, was determined. An augmentation of the brain-temperature was produced by these means, especially by the latter, and Mosso emphasizes the fact that the increase in temperature in the brain preceded the rise in the blood and rectum, indicating that it was a direct and not an indirect outcome of the stimulation. Although the brain is normally colder than the blood or rectum, owing to its small bulk and the readiness with which it loses heat through the cranium, yet by psychical activity, by excitation, etc., its temperature may be raised above that of the other organs named by as much as 0.2° C. to 0.3° C. for several hours. When the action of the narcotic is more profound, even strong direct electrical stimulation of the brain may be attended by little or no increase in temperature. He states, without in this paper giving the proofs, that sleep cannot be explained by changes in the circulation, that we may awake, think, and have consciousness before the circulation has had time to become modified. "The basis of the psychical process is, very probably, a chemical phenomenon." Electrical excitation of muscles produces a rise of temperature in them which, however, quickly disappears after the excitation ceases, but electrical excitation of the brain causes a rise of temperature there which may persist for some time; there is a long after-effect which may explain the epileptic convulsions that come some minutes after stimulation of the cortex. Certain agencies—cocaine, *e.g.*—may produce a marked rise of temperature in the brain without a concomitant augmentation of psychical activity, without, in fact, bringing the animal to a conscious condition. So that the temperature of an organ may increase or diminish independently of the specific work of the organ; in the brain the rise of temperature caused by strychnine or cocaine is far greater than that possible from psychical activity.

Effect of Section of the Posterior Roots on the Excitability of the Motor Zone.—Section of the posterior roots is known to modify the irritability of the corresponding motor roots, the inflow of impulses along the sensory tracts being necessary, apparently, to the normal irritability of the motor fibres. ⁴⁰⁹Tomasini, _{v. 23, p. 30, '95} endeavors to determine whether there is a similar synergetic relationship between posterior roots and the motor areas of the cortex. To this end he first determined the normal irritability of the motor areas of the hind-limbs by direct electrical excitation, and then determined the immediate, as well as the permanent, effect

upon this excitability of section of the posterior roots receiving fibres from the hind-limbs. He finds that the immediate effect is an augmentation of cortical irritability, which he explains as due to the increased stimulation of the posterior-root fibres, in consequence of the section. But subsequently there is a distinct diminution in cortical irritability in the motor regions for the hind-leg. The movements aroused by stimulation of the cortex, under these latter conditions, are characterized, also, by a lack of co-ordination. He concludes that the integrity of general sensibility is necessary to the proper functional activity of the motor centres of the cortex.

Secondary Degenerations in Cord and Medulla.—Pellizzi,⁴⁰⁹
v. 24, p. 89
in his histological study of degeneration, makes use of the method of Marchi and of the modification of this method introduced by Vassale. Some useful directions are given as to the application of these methods. To produce the lesions giving rise to the degenerations Pellizzi employed various methods,—*e.g.*, compression of the cord, hemilateral cauterization of the cord, hemisection and section of the anterior or posterior roots of the cervical, lumbar, and sacral nerves. The results are described in detail and protocols of the experiments are given. The following are some of the conclusions reached by the author: The fibres of the direct (lateral) cerebellar tract show an ascending degeneration and a smaller descending degeneration. Some of its fibres in each case remain normal. The fibres arise mainly from the cells of the column of Clarke, going, in greater part, to the same side and, to some extent, crossing to the other side through the column of Clarke. Some of the fibres of this column arise directly from the posterior roots, and these fibres seem to pass in almost equal parts to the cerebellar tracts of the two sides. The fibres of the tract of Gowers degenerate almost equally in an ascending and a descending direction. The fibres constituting this tract come, in good part, from the postero-lateral portion of the anterior horn, but a great many, also, as in the case of the cerebellar tract, come directly from the posterior roots, and these latter seem to supply the tracts of both sides. The author distinguishes a tract of fibres along the anterior and internal borders of the anterior white columns, which has been described before by Löwenthal, especially, and which, therefore, he designates as the tract of Löwenthal. This tract is found along the entire length of the cord. The fibres seem to degenerate both in an ascending and a descending direction. They arise, in large part, from cells in the anterior part of the posterior horns and cross in the anterior commissure to the opposite side. In this tract, also, are found fibres coming in

from the posterior roots without ending in the gray matter and supplying the tracts of each side. It is a very interesting fact that, in the three cord-tracts named, the fibres which they receive from the posterior roots divide up about equally from the two sides. These latter fibres have, of course, their nutritive centres in the posterior-root ganglion, and not in the cord. The fibres of the so-called direct cerebellar tract and the tracts of Gowers and Löwenthal, when followed anteriorly, are found to end in the cerebellum. In the medulla the tract of Löwenthal becomes fused with that of Gowers. The course into the cerebellum, according to the author, is by three paths: a posterior or dorsal path, made up mainly of the fibres of the direct cerebellar tract which reaches the cerebellum through the restiform body and inferior peduncle and ends after crossing the mid-line in the superior vermis in its superior, anterior, and inferior part; a ventral path which passes forward in the pons and bends backward to reach the cerebellum through the superior peduncle and ends after crossing in the anterior and inferior portion of the superior vermis; and a median path, first described in this paper, which passes into the cerebellum through the middle peduncle and ends, probably after crossing, in the antero-superior portion of the superior vermis. It will be seen, from this description, that these cerebellar fibres arise in the cord from the cells of the column of Clarke, from cells in the postero-lateral portion of the anterior horn, and from cells in the anterior part of the posterior gray horns; but, in addition, some of them are posterior-root fibres continued directly upward from the posterior roots of the spinal nerves.

Functions of the Cerebellum.—A very interesting paper by Russell ²⁰⁵⁷_{B.185,'95} contains an account of valuable experiments upon the removal of parts or all of the cerebellum. The operations were performed with aseptic precautions and the temporary, as well as the permanent, results of the lesions are carefully described. A median vertical section, separating the cerebellum into two halves, gave no distinct effect. Even forty-eight hours after the operation the animal showed no defects as the result of the operation, indicating that the functional connections of the cerebellum are mainly on the same side of the body. After extirpation of one lateral lobe the animal showed at first an inability to stand, owing mainly, apparently, to a paresis of the posterior extremities. After the animal was able to stand he showed a tendency to fall to the injured side. He showed, also, marked inco-ordination, with cerebellar reeling toward the sound side. There was great unsteadiness of the head and a tendency to rotate round the long axis toward the sound side. Russell was able to discover, also, a

marked analgesia and anæsthesia in the posterior extremities, chiefly on the same side. In the recovery of the animal the posterior extremities were the last to regain the normal condition. After an interval of two to three months no effect of the operation was discernible except exaggerated tendon reflexes on the operated side. Removal of one-half of the cerebellum, including the middle lobe, gave similar symptoms, with the difference that the effects were intensified and lasted a longer time. Electrical excitation of the motor areas of the cerebrum after removal of one lateral lobe of the cerebellum showed that the excitability of the opposite cerebral hemisphere was markedly increased. This fact was brought out clearly also in further experiments in which, after removal of one lateral lobe of the cerebellum, cortical convulsions were produced by intra-venous injection of absinthe. The convulsions were measured in the extensor muscles of the fore-limbs, which were connected on the two sides with recording myographs. It was found that the convulsions from the opposite cerebral hemispheres, and affecting, therefore, the muscles on the same side as the cerebellar lesion, were much the greater. After removal of both lateral lobes of the cerebellum motor paresis and diminished sensibility were observed in all the extremities, but mainly in the posterior limbs; there was also a great loss of co-ordination, showing itself in a general unsteadiness, but no rotation round the long axis. The animals in this case were not kept to observe the permanent effects. When the entire cerebellum was removed, in addition to the ocular deviation consisting in a downward rotation of both eyes and a certain amount of nystagmus following upon movements of the eyeballs, there was a marked paresis affecting chiefly the posterior extremities and a general unsteadiness of movement. Anæsthesia and analgesia were observed, manifesting themselves chiefly in the posterior limbs. No distinct trophic disturbances followed the lesions. For a week or two following the operation the animals might waste, but eventually they became well nourished and gained in weight. Russell concludes that the temporary impairment of movements following cerebellar lesions is due to inco-ordination, rigidity, and paresis. The paresis has been overlooked by other observers; that it was not due to injury of the anterior pyramids is sufficiently shown by the fact that it was on the injured side. It would seem from this result that the cerebellum exerts a direct motor influence on the spinal centres, each hemisphere controlling mainly its own side. The symptom of inco-ordination he explains by supposing that it is due chiefly to an overaction of the muscles on the sound side, in an attempt to compensate for the muscles on the paralyzed side. The anæ-

thesia and analgesia noted by Russell seem to have escaped previous observers; they point to a sensory function of the cerebellum. As in the case of injuries to the motor cortex of the cerebrum, the limbs paresed are those in which the sensibility is blunted.

Special Senses.

Perception of Different Colors in the Same Depth of the Retina.—

A. Schapring ²⁴⁶_{v.61,p.296} states that when the eye looks at an illuminated background through two holes, rather close together, of a screen moving to and fro very near the pupil, it perceives a double image of the figure of Purkinje. By means of the other eye this double image can be projected on a scale and the distance between the two images measured. König and Zumft ²⁰⁵⁸₉₄ performed this experiment, using monochromatic light, and found that the distance depends on the color, being greatest for red and shortest for blue colors, and concluded from this fact that the red-perceiving layer of the retina is farther removed from the artery casting the shadow than the blue-perceiving zone. This fact was further urged by them as a serious objection to Hering's theory of color-vision, since, if red and green are perceived at different depths of the retina, a red-green substance is out of the question.

The author of this paper briefly demonstrates that the unequal separation of the two Purkinje figures, when seen with different colors, is not at all in conflict with the generally-accepted view, that the perception of all colors takes place in the same depth of the retina. It is entirely explained by the chromatic aberration of the refracting media of the eye. The author shows, for example, that the centre of the diffusion circle formed upon the retina by light coming from a colored luminous point anywhere outside the optic axis will be farther from this axis the greater the wave-length of the light used. In the experiment with the holes in the screen, it is evident that only one can lie in the line of sight; the centre of the shadow from the other will, therefore, be farther removed from the axis of the eye when red illumination is used than with light of shorter wave-lengths,—i.e., the shadows are farther apart in the red light. So that the above objection of König and Zumft against the Hering theory falls to the ground.

Miscellaneous.

On the Acclimatization of Organisms to High Temperatures.—

C. B. Davenport and W. E. Castle ²⁰⁵⁹_{B.2,H.2,p.227} collected, in tabular form, the experiments of numerous observers, made for the purpose of determining the highest temperature which organisms reared under normal conditions will withstand. The observations cover

the whole range of the animal kingdom, and, even when due allowance is made for the fact that they were made by many different individuals and under somewhat varying conditions, they justify the conclusion that all protoplasmic structures do not have the same "heat-rigor," or lethal temperature. Thus, for the protista, excepting the ciliata, the maximum temperature is about 60° C. (140° F.); for the metazoa the maximum temperature is 45° C. (113° F.), many of the latter, however, dying at a much lower point. A considerable number of species from different classes of animals live normally in hot springs, and when the authors tabulated the recorded observations on this point they found that organisms may live in hot springs at a temperature far above the highest which their allies taken directly from ordinary water can resist,—*e.g.*, green algæ, 70° C. (158° F.); moluses, 50° C. (122° F.); rotifera, 80° C. (176° F.).—not considering observations in regard to whose accuracy there could be any doubt. These organisms, according to the accepted view, have descended from ancestors living in cooler water, and were adapted by acclimatization to their new environment. This acclimatization might have been "race" acclimatization, brought about by selection; but, according to the authors, it may have taken place without selection, purely by the capacity of "individual" adaptation. This individual adaptation has been experimentally demonstrated in protozoa by Dallinger, who succeeded in rearing flagellata at so high a temperature as 70° C. (158° F.) by slowly raising the temperature of the water in the course of several years from 15.6° C. (60° F.) up to that height.

The authors' own experiments, detailed in this paper, are intended to prove that it holds true for metazoa likewise.

Using tadpoles for their work, they find that, while the temperature of heat-rigor lies between 40° and 41° C. (104° and 106° F.) for tadpoles reared at 15° C. (59° F.), others growing for the same time (four weeks) at 24° to 25° C. (75° to 77° F.) only go into heat-rigor at 43° to 44° C. (109° to 111° F.); that is, in four weeks an individual acclimatization amounting to 3.2° C. (5.7° F.) on the average was accomplished without selection. This acclimatization was transitory, but persisted for an undetermined period after returning to cool water. It had been only partially lost in seventeen days after being returned to water at 15° C. (59° F.) Their explanation of the process by which this greater resistance is gained is briefly as follows: At the higher temperature the increased metabolism of the protoplasm is accompanied by the elimination of water from the chylema spaces. This explanation is based on a number of well-established facts, such as

the influence of drying in raising the temperature of heat-coagulation of proteids; the much greater resistance of spores and encysted stages of organisms than the corresponding motile stages, the former indicating by their optical properties and by their shrinkage that they are poorer in water; the fact that moist yeast is killed at a temperature below 60° C. (140° F.) while dry yeast may be heated to 100° C. (212° F.) without losing its vitality. The most direct proof, perhaps, is found in some unpublished experiments of J. I. Hamaker, who gradually acclimatized certain ciliata to dense solutions, by which operation the body becomes smaller and the protoplasm condensed. In these ciliata with reduced chylema the point at which heat-rigor took place was found to be elevated.

Thermotropism of Unicellular Organisms.—M. Mendelsohn's paper²⁴⁶_{v.60,p.1} contains the most detailed study that has yet been made of a phenomenon hitherto but little investigated. There are, in fact, only two cases on record in which the directing influence of thermal stimuli on the movement of lower organisms has been clearly made out. A positive thermotropism was demonstrated by Stahl for a myxomycete, *Æthaliium septicum*. M. Verworn observed a negative thermotropism in *Amœba limax*. In a more recent experiment of Verworn's, published by Jensen, it was found that paramœcia were positively thermotropic below 23° C. (73° F.), negatively thermotropic above that temperature. It was this experiment that suggested the experiments of the author described in this paper. He devised a convenient apparatus for altering the temperature at either end of a bath 10 to 20 centimetres in length, into which was brought water containing a large number of *Paramœcia aurelia*. These ciliated infusoria average about 0.2 millimetre in length; so that their migrations could be followed with the naked eye as they moved over the black background of the trough. Briefly stated, the results were as follow: The optimum temperature for paramœcia reared under normal conditions lies between 24° and 28° C. (75° and 82° F.). When the temperature of the water is the same throughout, these organisms are evenly distributed and move irregularly in all directions; but as soon as the temperature at either end is raised or lowered above or below the optimum they move in a definite direction, with the result of accumulating in a dense swarm in that part of the trough where the optimum prevails, or, at least, the temperature nearest to this optimum. In the case, for instance, where the temperature at the right end of the bath was 36° C. (97° F.) and at the left 12° C. (54° F.), the accumulation took place near the middle. When both ends are below 24° C.

(75° F.)—say, 15° C. (59° F.) at the left and 20° C. (68° F.) at the right—they all move to the right-hand end. To get a reaction at all, however, it was found that in a trough 10 centimetres long there must be a difference of at least 3° C. (5.4° F.) between the two ends. That means that for these particular paramæcia—0.2 millimetre in length—a difference of 0.01° C. (0.018° F.) at the poles of the cell-body is required in order to act as efficient stimulus.

A number of experiments were also made showing that the optimum is subject to change through acclimatization. Exposure to 36°–38° C. (96.8°–100.4° F.) for four to six hours raised the optimum from 24°–28° C. (75°–82° F.) to 30°–32° C. (86°–90° F.),—a fact which must be taken into account when experiments on thermotropism extend over longer periods.

The rate of movement under the influence of these thermal stimuli was found to vary with the temperature. It was most rapid between 20° and 30° C. (68° and 86° F.), being retarded both by low temperatures as well as by temperatures above 35° C. (95° F.).

Control experiments on paramæcia killed by overheating and on other light bodies floating in water proved that the observed movements were not passive, resulting from any currents in the water produced by the temperature changes, and other agencies—such as heliotropism, geotropism, and chemotropism—were carefully excluded.

There can be no doubt that the author was dealing with a genuine thermotropism, which must be set down as one of the vital phenomena of protoplasm. As in the case of other external agencies which act as stimuli on the living substance, a definite relation is made out between the strength of the stimulus and the amount of the response, while the slight difference of temperature as measured above—which is still sufficient to orient the movements—indicates a very refined discriminating power of protoplasm toward thermal stimuli.



INDEX TO VOLUME FOURTH.

By N. I. DEVEREUX,
PARIS.

Abdomen, anatomy.....H- 43	Anatomy, miscellaneous malforma- tions, gums.....H- 48	Circulation, physiology.....J- 6
Aene.....A- 1	nosencephalia.....H- 49	Climacteric, laryngeal neuroses of...D- 93
kerata.....A- 1	esophagus.....H- 47	Cold, signs of death from.....F- 13
Meibomian.....A- 1	otocephalus.....H- 50	Color-blindness.....B- 12
scrofulosorum.....A- 2	pleura.....H- 47	Color-blindness, diseases (see Eye).....B- 53
vulgaris.....A- 4	polydactyl.....H- 48	Conjunctiva, diseases (see Eye).....B- 69
Actinomyces.....E- 1	spleen.....H- 10	Cornea and sclerotic, diseases (see Eye).....B- 63
Adenitis, cervical.....D- 43	muscles.....H- 12	Cornea (see Nasal cavities, diseases).....D- 6
Adenoid vegetations.....A- 5	rector anguli scapula.....H- 12	Coryza (see Nasal cavities, diseases).....E- 29
Adenoma sebaceum.....G- 1	diaphragm.....H- 12	Cretinism.....B- 28, 61
Alimentation, hygiene of.....G- 9	diastolic.....H- 10	Cysticercus of eye.....B- 28, 61
bread.....G- 1	extensor longus digitorum.....H- 13	
drinking-water.....G- 16	extensor of leg.....H- 15	Dacryocystitis.....B- 32
meat.....G- 10	flexor longus digitorum.....H- 13	Death, signs of.....F- 13
milk.....G- 20	gastrocnemius.....H- 11	sudden.....A- 11
oysters.....A- 6	intercostal.....H- 12	Dermatitis.....A- 12
Alopecia.....A- 6	levator anguli scapula.....H- 11	repeus.....A- 12
areata.....A- 7	rectus abdominis.....H- 13	Dermatology (see Skin, diseases).....A- 1
syphilitic.....A- 7	supinator longus.....H- 13	Diabetes mellitus, and ocular disease.....B- 134
traumatic.....A- 7	thyroid.....H- 31	and otitis media.....C- 35
universalis.....B- 133	nervous system.....H- 31	deformities.....F- 16
Amblyopia, tobacco.....I- 21	brain.....H- 40	Digestion, physiology.....J- 24
Amnion, histology.....H- 1	Corti's membrane.....H- 34	Digestive system, histology.....B- 139
Anatomy.....H- 15	foot of cat.....H- 41	Dinitrobenzol, amblyopia from.....B- 56
arterial system.....H- 15	middle ear.....H- 41	Diphtheria, conjunctival.....B- 34
anomalies of heart.....H- 19, 20	peripheral nerves.....H- 42	Diplopia.....G- 21
brachial.....H- 19, 20	skeletal muscles.....H- 36	Disinfection.....G- 21
dorsalis pedis.....H- 19	uterus.....H- 37	dwellings and wearing apparel.....G- 25
femoral.....H- 21	Anencephalus.....F- 12	portable disinfectors.....G- 25
hepatic.....H- 19	Anenrismus, sudden death from.....A- 9	sick-room.....G- 23
lingual.....H- 19	Angioma.....B- 1	
mammary.....H- 20	Anophthalmos.....D- 27	Ear, anatomy.....H- 37, 41
obturator.....H- 22	Anosmia.....D- 35	Ear, diseases.....C- 1
omental.....H- 18	Antrum of Highmore, diseases.....D- 35	Ear, external.....C- 1
ophthalmic.....H- 19	empyema.....B- 25, D- 35	auricle.....C- 3
subclavian.....H- 19	foreign bodies.....D- 38	deformities.....C- 5
thyroid.....H- 19	tumors.....D- 94	external auditory canal.....C- 8
tibial.....H- 6	Aphonia, hysterical.....H- 44	diffuse inflammation.....C- 7
articulations.....H- 7	Appendix vermiciformis, anatomy.....H- 15	eczema.....C- 7
hip.....H- 7	Arterio-venous system, histology.....I- 10	exostosis.....C- 11
tendon-sheaths.....H- 1	Articulations, anatomy.....H- 6	new instruments.....C- 8
bones.....H- 2	Atropia of skin.....C- 1	stenosis.....C- 1
aeromion.....H- 3	Auricle, diseases.....C- 3	tumors.....C- 36
antibrachii.....H- 5	deformities.....C- 3	Ear, internal.....C- 36
astragali.....H- 5	tumors.....C- 1	brain-abscess.....C- 36
calcaneum.....H- 1	Basal hernia.....D- 51	necrosis of cochlea.....C- 44
cerebral fossa.....H- 1, 4	Baselov's disease.....E- 6	nerve-deafness.....C- 40
long bones.....H- 1	Bladder, anatomy.....B- 18	tests for hearing.....C- 31
apophoid.....H- 1	Blaspharitis.....J- 1	Ear, mastoid.....C- 32
sternum.....H- 1	Blood, physiology.....F- 9	operations on.....C- 9
trigonum.....H- 6	Blood-stasis, identification of.....H- 1	Ear, membrane and abnormalities.....C- 9
gastro-intestinal system.....H- 43	Brain, anatomy.....H- 31	injuries and abnormalities.....C- 12
abdomen.....H- 43	histology.....H- 33	Ear, middle.....D- 20
appendix vermiformis.....H- 46	physiology.....G- 9	nasal disease and.....C- 12
cæcum.....H- 44	Bread, bacteriology.....A- 10	otitis media.....C- 25
jejunum and ileum.....H- 44	Bulpsis.....B- 53	neuroses and.....C- 12
length of intestine.....H- 45	Burns of conjunctiva.....B- 53	non-suppurative.....C- 20
Meckel's diverticulum.....H- 45	Cæcum, anomalies.....H- 46	suppurative.....C- 27
navel-loop.....H- 45	Carbon-monoxide gas, poisonous ac- tion.....J- 22	suppurative, with mastoiditis.....I- 23
peritoneum.....H- 45	Cataract.....J- 36	Ear, histology.....A- 13
small intestine.....H- 23	Cerebellum, function of.....E- 1	Eczema.....C- 11
genito-urinary system.....H- 29	Cervical adenitis.....B- 45, 118	gouty.....A- 11
bladder.....H- 27	Chancres of eyelids.....A- 11	marginatum.....A- 13
cloaca.....H- 27	Chilblains.....G- 37	mercurial.....C- 7
fourchette.....H- 27	Cholera, epidemiology.....B- 85	of auditory canal.....A- 16
hermaphroditism.....H- 24	Choroid, diseases (see Eye).....B- 43	pillars.....A- 17
kidney.....H- 30	Ciliary body, diseases (see Eye).....B- 43	seborrhæic.....F- 7
paraurethral duct in the female.....H- 25		Electrotonia.....A- 17
penis.....H- 25		Elephantiasis.....B- 24
testicles.....H- 23		Enophthalmos.....A- 47
ureter.....H- 23		Entropion.....G- 32
uterus.....H- 23		Epidemiology.....G- 37
ligaments.....H- 9		cholera.....G- 32
interosseous.....H- 10		small-pox.....G- 47
cuneo-metatarsal.....H- 47		yellow fever.....D- 29
miscellaneous malformations.....H- 47		Epilepsy, from nasal disease.....B- 11
anencephalus.....H- 49		ocular conditions.....B- 11

(K-1)

Epistaxis.....	D-25	Eye, lids, diseases, ankylobleph-		Glandular system, diseases.....	E-1
Epithelioma of the skin.....	A-18	arion.....	B-44	cervical adenitis.....	E-1
Erysipelas.....	A-19	blepharoplasty.....	B-47	pathology.....	E-1
Erythema.....	A-23	chancre.....	B-45	treatment.....	E-1
Erythropia.....	A-27	ectropium.....	B-48	exophthalmic goitre; Graves's	E-3
Ethmoidal sinuses, dilatation.....	B-25	entropium.....	B-47	disease; Basedow's disease.....	E-6
Exophthalmic goitre.....	E-6	epithelioma.....	B-48	treatment.....	E-17
Exophthalmos.....	B-24	hordeolum.....	B-45	goitre.....	E-17
Extra-ocular muscles (see Eye, dis-		hypertropia.....	B-45	etiology.....	E-17
eases).....	B-33	pediculi ciliaris.....	B-44	pathology.....	E-18
Eye, diseases.....	B-1	ptosis.....	B-44	treatment.....	E-20
anomalies, embryology, histologi-		symblepharon.....	B-43, 52	lymphadenoma.....	E-4
cal anatomy.....	B-1; I-22	tumors.....	B-46	pathology.....	E-5
anophthalmos.....	B-1	medical ophthalmology.....	B-116	treatment.....	E-4
anterior chamber, embryology.....	B-2	cerebral disease.....	B-130	myxedema.....	E-6
coloboma of choroid.....	B-2	dental affections.....	B-120, 136	congenital; cretinism.....	E-29
coloboma of lens.....	B-1	tumors.....	B-134	pathology.....	E-23
congenital ectopia of lens.....	B-2	dinitrobenzol poisoning.....	B-139	treatment.....	E-26
retained optic nerve-sheaths.....	B-2	diphtheria.....	B-127	Glaucoma.....	B-108
retina.....	B-3	dyscrasia due to toxins.....	B-118	Glycolysis.....	J-26
choroid, diseases.....	B-85	exposure to sun, toxins.....	B-128	Goitre.....	E-17
chorioretinitis.....	B-85	goitre.....	B-137	etiology.....	E-17
choroiditis.....	B-85	gonorrhoea.....	B-132	pathology.....	E-18
iridochoroiditis.....	B-85	hemophilia.....	B-128	treatment.....	E-20
melanosarcoma.....	B-86	hepatic disease.....	B-118	Goitre, exophthalmic.....	E-6
sarcoma.....	B-86	hypertropia.....	B-121	symptoms.....	E-8
tuberculosis.....	B-86	influenza.....	B-121, 137	ocular.....	B-137
conjunctiva, diseases.....	B-53	injuries.....	B-120, 136	treatment.....	E-15
angioneurotic oedema.....	B-62	injuries.....	B-116, 139	Gonorrhoea, sudden death from.....	F-11
bacteria of.....	B-53	male-fern poisoning.....	B-139	optic neuritis from.....	B-132
burns.....	B-53	nasal diseases.....	B-121; D-30	Graves's disease (see Goitre, ex-	
conjunctivitis, granular.....	B-53	paralysis.....	B-126	ophthalmic).....	E-6
in newborn.....	B-54	pneumonia.....	B-122	Gums, malformation.....	H-48
pneumococcus.....	B-55	renal disease.....	B-129		
pseudomembranous.....	B-56	syphilis.....	B-118, 125, 129, 135		
purulent.....	B-57	tabes.....	B-127		
cyst.....	B-54, 62	tobacco.....	B-137		
cysticercus.....	B-61	tuberculosis.....	B-128		
epithelioma.....	B-63	optic nerve, diseases.....	B-119		
leprosy.....	B-63	cupping of discs.....	B-97		
navus.....	B-63	hyaline formations.....	B-98		
polypoid neoplasms.....	B-63	neuritis.....	B-98		
pterygium.....	B-61	tumors.....	B-98		
sponge-grafting, accidental.....	B-61	orbit, diseases.....	B-98		
syphilis.....	B-62	cryst.....	B-24		
tumchoma.....	B-58	cysticercus.....	B-28		
ulcer.....	B-54	exophthalmos.....	B-24		
cornea and sclera.....	B-63	injuries.....	B-24		
blood-staining of cornea.....	B-68	periostitis.....	B-25		
congenital disease.....	B-63	retrobulbar abscess.....	B-27		
corneal transplantation.....	B-67	tenonitis.....	B-24		
epithelioma.....	B-69	physiology.....	B-29		
foreign bodies.....	B-64	accommodation.....	B-3		
keratitis, filamentary.....	B-65	color-perception.....	B-11; B-6		
interstitial.....	B-66	contraction of pupils.....	B-38		
malignant.....	B-65	corneal circulation.....	B-3		
neuroparalytic.....	B-66	diffusion of liquids.....	B-4		
parenchymatous.....	B-66	electrical reaction.....	B-15		
punctate.....	B-66	eyes in repose.....	B-8		
staphylocoma.....	B-69	reaction of retina.....	B-5		
strumous.....	B-67	visual impressions.....	B-10		
ulcer.....	B-64	visual power.....	B-9		
extra-ocular muscles.....	B-33	refraction and accommodation.....	B-23		
asthenopia.....	B-34	aphakia eyes.....	B-23		
cyst.....	B-43	asthenopia.....	B-18		
diplopia.....	B-34	astigmatism.....	B-16		
nyctagmus.....	B-38	blepharitis.....	B-18		
paralysis.....	B-34	heterophoria.....	B-15		
strabismus.....	B-38	myopia.....	B-20		
glaucoma.....	B-108	retina, diseases.....	B-87		
iris and ciliary body.....	B-69	coloboma.....	B-87		
corectopia.....	B-69	detachment.....	B-94		
ectropium uvulae.....	B-70	embolism.....	B-84		
flaria.....	B-70	erythropia.....	B-87		
foreign bodies.....	B-70	glioma.....	B-96		
injuries.....	B-70	gliosarcoma.....	B-97		
iritis.....	B-71	hemorrhage.....	B-91		
paralysis.....	B-70	retinitis, pigmentosa.....	B-94		
arabachia.....	B-72	proliferans.....	B-93		
tubercle.....	B-71	syphilis.....	B-93		
variations in color.....	B-73	retinochoroidal degeneration.....	B-93		
variations in color.....	B-69	striated affection.....	B-92		
lacrimal apparatus.....	B-29	thrombophlebitis.....	B-92		
abscess.....	B-32	therapeutics and instruments.....	B-140		
dacryocystitis.....	B-31	unclassified.....	B-149		
fiatula.....	B-30	vitreous, diseases.....	B-87		
hypertrophy.....	B-30	foreign bodies.....	B-87		
obstruction.....	B-29	hemorrhage.....	B-87		
prolapse.....	B-29	wounds, injuries, and foreign	B-99		
stricture.....	B-31	bodies.....			
tuberculosis.....	B-30				
tumor.....	B-33				
lens.....	B-73	Favus.....	A-26		
cataract.....	B-74	Flaria in eye.....	B-70		
dislocation.....	B-73	Fourcheta anatomy.....	B-11; 27		
opacity.....	B-73	Frontal sinus, diseases.....	D-39		
lids, diseases.....	B-43	empyema.....	D-39		
anesthesia for plastic operations	B-46	Frost-bite.....	A-27		
		Genito-urinary system, anatomy.....	H-23		

INDEX TO VOLUME FOURTH.

Ichthyosis to
Physiology.]

- Ichthyosis hystrix.....A- 31
 Impetigo.....A- 33
 gangrenous.....A- 33
 herpeticiform.....A- 33
 Inebriety and insanity.....F- 2
 Influenza, and eye diseases.....B-120, 136
 caries of temporal bone after.....D- 99
 laryngeal paralysis in.....F- 1
 Insanity, and crime.....C- 1
 ophthalmoma in.....I- 17
 Intestines, histology.....B- 69
 Iris and ciliary body, diseases.....B- 69

 Keloid.....A- 34
 Keratitis.....B- 65
 Keratoderma.....A- 34
 Kidney, anatomy.....H- 30
 function.....J- 31

 Lacrymal apparatus, diseases (see Eye).....B- 29
 Larynx, diseases.....D- 78
 anatomy and physiology.....D- 91
 foreign bodies.....D- 91
 fracture of larynx and trachea.....D- 90
 herpes.....D- 94
 hyserical aphonia.....D-108
 infra-glottic space.....D-108
 stenosis.....D-109
 tumors.....D-104
 laryngectomy.....D- 80
 laryngitis.....D- 89
 syphilitic.....D- 93
 neuroses.....D- 96
 paralysis.....D- 96
 spasms.....D- 89
 stenosis.....D-106
 thyrotomy.....D-107
 tracheotomy.....D- 81
 tuberculosis.....D-100
 tumors.....D-101
 adenoma.....D-100
 cyst.....D-102
 fibroma.....D-102
 lipoma.....D-103
 malignant.....D-102
 papilloma.....D-103
 tuberculous growths.....F- 1
 Legal medicine.....F- 1
 insanity and crime.....F- 8
 medico-legal tests.....F- 8
 prevention of crime.....F- 15
 prostitution.....F- 5
 punishment.....F- 13
 signs of death.....F- 11
 sudden death.....F- 11
 suicide.....F- 16
 traumatic diseases.....B- 73
 Lens, diseases (see Eye).....B- 36
 Leprosy.....A- 37
 Leucoderma.....A- 39
 Lichen, erythematousum.....A- 37
 pilaris.....A- 38
 planus.....A- 38
 ruber acuminatus.....A- 39
 scrofulosorum.....B- 43
 Lids, diseases (see Eye).....B- 43
 Ligaments, anatomy.....H- 8
 Lingual tonsil, diseases.....D- 55
 Ludwig's angina.....D- 41
 Lupus vulgaris.....H- 49
 Lymphadenoma.....F- 4
 Lymphadenoma, histology.....F- 15
 Lymphatic system, histology.....F- 15

 Malaria, keratitis from.....B- 65
 Male fern, amblyopia from.....B-139
 Masse, effect of, on circulation.....J- 14
 Mastoid, diseases.....C- 31
 operations.....B- 25
 Maxillary sinus, empyema.....G- 16
 Meat, poisoning by.....G- 18
 tuberculous.....D- 31
 Melancholia from nasal disease.....D- 31
 Melanoma.....A- 41
 Melanoma, histology.....C- 9
 Membrana tympani, diseases.....C- 9
 injuries and abnormalities.....C- 9
 Meningitis, ocular complications.....B-150
 Migraine from nasal disease.....B- 11
 visual conditions.....G- 10
 Milk, bacteria.....G- 10
 infection.....G- 11
 sterilization.....G- 11
 tuberculous and.....G- 14
 Molluscum contagiosum.....A- 42
 Mounting media.....F- 31
 Murder, tests for.....F- 8
 Muscle, histology.....J- 13
 physiology.....J- 31
 Muscles, anatomy.....H- 10

 Mycosis, fungoides.....A- 42
 of pharynx.....D- 62
 Myopia.....E- 23
 Myxodent.....E- 20
 congenital.....E- 25
 diagnosis.....E- 25
 pathology.....E- 25
 treatment.....E- 26

 Nails.....A- 43
 Nails, histology.....I- 27
 Nasal cavities, diseases.....D- 35
 accessory cavities.....D- 35
 empyema of antrum.....D- 38
 foreign bodies in antrum.....D- 38
 frontal sinus, empyema.....D- 41
 Ludwig's angina.....D- 41
 sphenoidal sinus.....D- 41
 tumors of antrum.....D- 38
 anatomy, physiology, and his-
 tology.....D- 1
 anterior cavities.....D- 3
 bacteriology.....D- 3
 cysts and cystic polypi.....D- 25
 epistaxis.....D- 18
 fibroma.....D- 20
 lipoma.....D- 15
 lupus.....D- 21
 malignant growths.....D- 7
 ozæna.....D- 6
 treatment.....D- 6
 polyp.....D- 5
 rhinitis, acute.....D- 6
 atrophic.....D- 4
 hypertrophic.....D- 9
 membranous.....D- 17
 syphilitic.....D- 17
 rhinoscleroma.....D- 21
 neuroses.....D- 27
 anosmia.....D- 30
 aural.....D- 31
 cough.....D- 29
 epilepsy.....D- 32
 hay fever.....D- 29
 headache.....D- 29
 melanoholia.....D- 31
 neuralgia.....D- 30
 ocular.....D- 28
 parosmia.....D- 22
 septum, diseases.....D- 22
 abscess.....D- 23
 bleeding polypus; angiodoma.....D- 23
 malignant growths.....D- 22
 papilloma.....D- 24
 synchia, synostoses, occlusion,
 etc.....D- 22
 Nasal and accessory cavities, phar-
 ynx, larynx, trachea, and
 esophagus, diseases.....D- 43
 Naso-pharynx, diseases.....D- 43
 anaplasia, diseases.....D- 50
 tumors.....D- 50
 Nervous system, anatomy.....H- 31
 histology.....C- 26
 Neuralgia, in ear disease.....D- 29
 of nasal origin.....B- 98
 Neuritis, optic.....I- 1
 Neurons, theory of.....C- 23
 Newborn, otitis media in.....A- 44
 Nose, diseases of (see Nasal cavities).....D- 1
 Nosencephalus.....B-139
 Nystragmus.....H- 47

 (Edema, angioneurotic.....A- 44
 vasomotor.....A- 44
 vasomotor, diseases.....D-110
 anaplasia.....H- 48
 cancer.....D-111
 foreign bodies.....D-110
 stricture.....D-110
 Ophthalmia neonatorum.....B-104
 Ophthalmitis, metastatic.....B- 1
 Ophthalmology (see Eye, diseases).....B- 1
 Ophthalmoplegia, congenital ex-
 ternal.....B-125
 orbital.....B-124
 Optic nerve, diseases (see Eye).....B- 97
 Orbit, diseases (see Eye).....B- 24
 Otitis media.....C- 25
 and neuroses.....C- 12
 non-suppurative.....C- 13
 suppurative.....C- 20
 bacteriology.....C- 21
 treatment.....C- 27
 with mastoiditis.....C- 27
 Otology (see Ear, diseases).....C- 1
 Ovaries, histology.....I- 17

 Oysters, typhoid fever from.....G- 20
 Ozæna.....D- 7

 Palate, soft, diseases.....D- 52
 paralysis.....D- 54
 tumors.....D- 52
 Pancreas, histology.....I- 16
 Paralysis, facial, and ear disease.....C- 25
 ocular.....B-34, 126
 of larynx.....D- 28
 Parosmia.....B- 44
 Pediculi ciliaris.....A- 45
 Pemphigus.....H- 25
 Penis, anatomy.....J- 14
 vasomotor nerves of.....J- 14
 Peritoneum, anatomy.....H- 45
 Pharyngeal tonsil, tuberculosis.....D- 48
 Pharynx, diseases.....D- 56
 acute and phlegmonous phar-
 ynx.....D- 56
 chronic pharyngitis.....D- 58
 foreign bodies.....D- 68
 membranous pharyngitis.....D- 58
 mycosis.....D- 62
 pharyngotomy.....D- 67
 retropharyngeal abscess.....D- 59
 syphilis.....D- 61
 tuberculosis.....D- 65
 tumors.....D- 78
 Phonation, centre of.....J- 1
 Physiology.....J- 1
 blood.....J- 1
 changes after hæmorrhage.....J- 1
 coagulation.....J- 4
 nucleoproteids.....J- 4
 peptone injections.....J- 6
 circulation.....J- 1
 action of certain substances on
 heart of daphnia.....J- 12
 effect of gravity on.....J- 12
 effect of kneading of muscles.....J- 14
 human electrocardiogram.....J- 9
 influence of asphyxia on con-
 tractility of thoracic duct.....J- 21
 influence of respiration on ven-
 erous circulation of posterior
 extremities.....J- 17
 innervation of thoracic duct.....J- 20
 isolated mammalian heart.....J- 6
 method of measuring blood-pres-
 sure.....J- 13
 septal nerves of frog's heart.....J- 10
 vagus inhibition.....J- 6
 variations of venous pressure.....J- 18
 vasomotor nerves of penis.....J- 14
 digestion, nutrition, and heat-reg-
 ulation.....J- 24
 complete extirpation of stomach.....J- 24
 external temperature, effect on
 chick.....J- 28
 faradization of digestive canal.....J- 25
 glycolytic power of blood and
 tissues.....J- 26
 ductless glands.....J- 29
 influence of age on result of
 splenectomy.....J- 30
 spleen, and blood-formation.....J- 30
 suprarenal glands.....J- 31
 excretion.....J- 31
 function of kidney and action of
 function of lactics.....J- 31
 miscellaneous.....J- 38
 acclimatization of organisms to
 high temperature.....J- 38
 thermotropism of unicellular or-
 ganisms.....J- 40
 muscle and nerve.....J- 31
 galvanic currents of different
 intensity, effect.....J- 31
 time relations of voluntary tet-
 anus in man.....J- 33
 nervous system.....J- 33
 effect of section of motor roots
 on excitability of motor zone.....J- 34
 functions of phenomena and tem-
 perature of brain.....J- 33
 secondary degenerations in cord
 and medulla.....J- 35
 respiration.....J- 22
 poisonous action of carbon-mou-
 oxide gas.....J- 22
 pulmonary fibrosis of vagus.....J- 23
 respiratory activity of brain and
 muscle.....J- 22
 toxicity of asphyxiated blood.....J- 22
 special senses.....J- 38
 perception of different colors in
 the same depth of the retina.....J- 38

Pityriasis.....	A- 46	Skin, diseases, impetigo.....	A- 33	Technology.....	I- 28
Pneumonia, otitis media in.....	C- 21	gangrenous.....	A- 33	hardening.....	I- 30
panophthalmitis following.....	B-122	herpetiform.....	A- 33	mounting.....	I- 31
Polydactyly.....	H- 47	keloid.....	A- 33	staining.....	I- 31
Prostitution, control.....	F- 15	keratoderma.....	A- 34	Teeth, and ocular affections.....	B-136
Psoriasis.....	A- 47	keratosis.....	A- 34	histology.....	I- 27
Psoriasis.....	A- 48	leprosy.....	A- 36	Tenonitis.....	B- 24
Pterygium.....	B- 61	lichen.....	A- 37	Testicles, anatomy.....	H- 23
Purpura.....	A- 49	lichen, erythematous.....	A- 39	Tetanus, following ocular injury.....	B-108
		pilaris.....	A- 37	Thoracic duct, influence of asphyxia	
Refraction and accommodation (see		planus.....	A- 38	on.....	J- 21
Eye).....	B- 15	ruber acuminatus.....	A- 38	physiology.....	J- 20
Respiration, physiology.....	J- 22	scrofulosorum.....	A- 39	Thyroid gland, diseases.....	E- 17
Retina, diseases (see Eye).....	B- 87	lupus vulgaris.....	A- 39	cretinism.....	E- 29
Retropharyngeal abscess.....	D- 63	melanoma.....	A- 41	goitre.....	E- 17
Rhinitis.....	D- 4	miscellaneous.....	A- 56	etiology.....	E- 17
acute.....	D- 5	molluscum contagiosum.....	A- 42	pathology.....	E- 18
atrophic.....	D- 6	mycosis fungoides.....	A- 42	treatment.....	E- 20
hypertrophic.....	D- 4	naevus.....	A- 43	goitre, exophthalmic.....	E- 6
hypertrophic.....	D- 4	noma.....	A- 44	treatment.....	E- 15
membranous.....	D- 9	oedema, angioneurotic.....	A- 44	myxedema.....	E- 23
syphilitic.....	D- 17	vasomotor.....	A- 44	diagnosis.....	E- 25
Rhinocleroma.....	D- 21	gemmiferus.....	A- 45	pathology.....	E- 23
		pityriasis maculata.....	A- 46	symptoms.....	E- 25
Scleroderma.....	A- 50	ruba.....	A- 47	treatment.....	E- 26
Seborrhea.....	A- 50	versicolor.....	A- 47	Thyrotomy.....	D-106
Septicemia, from middle-ear disease.....	C- 31	pruritus.....	A- 47	Tobacco-amblyopia.....	B-138
Septum, diseases (see Nasal cavities).....	D- 22	psoriasis.....	A- 48	Tonsil, lingual, diseases.....	D- 55
Signs of death.....	F- 13	purpura.....	A- 49	inflammation.....	D- 55
Sinus-thrombosis and cerebral ab-		scleroderma.....	A- 50	Tonsils, diseases.....	D- 68
scess.....	C- 36	seborrhea.....	A- 50	hypertrophy.....	D- 72
Skin, diseases.....	A- 1	tattooing.....	A- 51	syphilis.....	D- 77
acne.....	A- 1	trichophyton tonsurans.....	A- 51	tonsillitis, acute.....	D- 68
kerata.....	A- 2	ulcers.....	A- 53	follicular.....	D- 70
Meibomian.....	A- 1	urticaria.....	A- 54	ulcerative.....	D- 72
scrofulosorum.....	A- 1	warts.....	A- 54	tumors.....	D- 75
vulgaris.....	A- 2	xeroderma.....	A- 55	Tracheotomy.....	D-107
actinomycosis.....	A- 4	Small-pox, epidemiology.....	G- 32	Trachoma.....	B- 58
adenoma sebaceum.....	A- 5	Soil, hygiene.....	G- 27	Trichophyton tonsurans.....	A- 51
alopecia.....	A- 7	Spasm, laryngeal.....	D- 96	Tuberculosis, hygiene.....	G- 30
areata.....	A- 6	Sphenoidal sinns, diseases.....	D- 41	Tuberculosis of bone, medico-legal	
syphilitic.....	A- 7	Spinal cord, histology.....	I- 7	aspect.....	F- 16
traumatic.....	A- 9	physiology.....	J- 35	Typhoid fever, from oysters.....	G- 20
treatment.....	A- 6	Spleen, anomaly.....	H- 49	from soil.....	G- 27
universalis.....	A- 7	physiology.....	J- 29	laryngeal paralysis in.....	D- 99
angioma.....	A- 9	staining.....	J- 28		
atrophy.....	A- 10	Stapedectomy.....	C- 13	Ulcers.....	A- 53
bupliss.....	A- 10	Starvation, death from, in children.....	F- 14	Umbilical cord, histology.....	I- 21
chilblains.....	A- 11	Sternum, anomaly.....	H- 48	Ureter, anatomy.....	I- 23
dermatitis herpetiformis.....	A- 11	Stomach, effect of extirpation of.....	J- 24	Urinary system, histology.....	I- 20
repens.....	A- 12	Strabismus.....	B- 38	Uterus, anatomy.....	I- 23
eczema.....	A- 13	Stramonium, amblyopia from.....	B-139	nerves of.....	I- 37
gouty.....	A- 14	Stridened death.....	F- 11	Uvula and palate, diseases.....	D- 32
marginatum.....	A- 14	Suicide.....	F- 10	paralysis of soft palate.....	D- 34
mercurial.....	A- 13	Suprarenal capsules, histology.....	I- 20	tumors.....	D- 32
pilaris.....	A- 16	physiology.....	J- 30		
seborrheic.....	A- 17	Symblepharon.....	B- 46	Veins, histology.....	I- 13
elephantiasis.....	A- 17	Sympathetic system, histology.....	I- 9	Vitreous, diseases (see Eye).....	B- 87
epithelioma.....	A- 18	of larynx.....	D- 99		
erysipelas.....	A- 19	of nasal cavities.....	D- 17	Water, hygiene of.....	G- 1
erythema.....	A- 23	of pharynx.....	D- 59		
favus.....	A- 26	of tonsils.....	D- 76	Xeroderma.....	A- 55
frost-bite.....	A- 27	Syringomyelia, laryngeal symptoms.....	D- 94	Yellow fever, epidemiology.....	G- 47
herpes zoster.....	A- 27				
histology.....	I- 24	Tabes, dorsalis, aural complications.....	C- 26		
hydroa.....	A- 30	ocular.....	B-137		
hydrocystoma.....	A- 31	Tattooing.....	A- 51		
ichthyosis hystrix.....	A- 31				

REFERENCE LIST.

JOURNALS.

1. New York Medical Journal.
2. British Medical Journal, London.
3. La semaine médicale, Paris.
4. Berliner klinische Wochenschrift, Berlin.
5. American Journal of the Medical Sciences, Philadelphia.
6. Lancet, London.
7. Bulletin de la Société anatomique, Paris.
8. Wiener klinische Wochenschrift, Vienna.
9. Medical News, Philadelphia.
10. Bulletin de l'Académie de médecine de Paris.
11. Journal of Laryngology, London.
12. New Orleans Medical and Surgical Journal, New Orleans.
13. Schmidt's Jahrbücher, Leipzig.
14. Le bulletin médical, Paris.
15. Practitioner, London.
16. Dublin Journal of Medical Sciences.
17. L'Union médicale, Paris.
18. L'Encéphale, Paris.
19. Medical and Surgical Reporter, Philadelphia.
20. Virchow's Archiv für pathologische Anatomie und Physiologie und für klinische Medizin, Berlin.
21. St. Petersburger medicinische Wochenschrift, St. Petersburg.
22. Medical Press and Circular, London.
23. Annals of Gynæcology and Pædiatry, Philadelphia.
24. Journal de médecine, Paris.
25. Archives cliniques de Bordeaux.
26. Provincial Medical Journal, Leicester, England.
27. American Journal of Obstetrics, New York.
28. Monatshefte für praktische Dermatologie, Hamburg.
29. Archiv für mikroskopische Anatomie, Bonn.
30. Annali di ottalmologia, Pavia.
31. La médecine moderne, Paris.
32. Birmingham Medical Review, Birmingham, England.
33. Bulletin médical des Vosges, Rambervillers.
34. Münchener medicinische Wochenschrift, Munich.
35. Revue gén. de clin. et de théor. jour. des praticiens, Paris.
36. Edinburgh Medical Journal, Edinburgh.
37. Annales des maladies de l'oreille, du larynx, du nez et du pharynx, Paris.
38. Asclepiad, London.
39. Canadian Practitioner, Toronto.
40. Gaillard's Medical Journal, N. Y.
41. Deutsche medizinische Zeitung, Berlin.
42. Internationales Centralblatt für Laryngologie, Rhinologie, und verwandte Wissenschaften, Berlin.
43. North Carolina Medical Journal, Wilmington, N. C.
44. Southern California Practitioner, Los Angeles.
45. Archiv für Dermatologie und Syphilis, Vienna.
46. Marseille-médical, Marseilles.
47. Brain, London.
48. Annales de gynécologie et d'obstétrique, Paris.
49. British Gynæcological Journal, London.
50. Centralblatt für Bakteriologie und Parasitenkunde, Jena.
51. Archives of Pediatrics, Philadelphia.
52. Bulletin de l'Académie royale de médecine de Belgique, Bruxelles.
53. Cincinnati Lancet-Clinic, Cincinnati.
54. Fortschritte der Medizin, Berlin.
55. Gazette médicale de Paris.
56. Indiana Medical Journal, Indianapolis.
57. Internationale klinische Rundschau, Vienna.
58. Zeitschrift für Hygiene und Infektionskrankheiten, Leipzig.
59. Medical Record, New York.
60. Mittheilungen aus der dermatologischen Klinik der Charité, Berlin.
61. Journal of the American Medical Association, Chicago.

62. Annales de la polyclinique de Paris.
63. Revue pratique d'obstétrique et d'hygiène de l'enfance, Paris.
64. Medical Abstract, New York.
65. St. Louis Courier of Medicine.
66. Archives of Otology, New York.
67. Bulletin général de thérapeutique, Paris.
68. Centralblatt für Nervenheilkunde, Psychiatrie und gerichtliche Psychopathologie, Coblenz.
69. Deutsche medicinische Wochenschrift, Leipzig.
70. Gazette hebdomadaire des sciences médicales de Bordeaux.
71. American Therapist, New York.
72. Kansas City Medical Index, Kansas City, Mo.
73. Le progrès médical, Paris.
74. Memphis Medical Monthly, Memphis, Tenn.
75. Neurologisches Centralblatt, Leipzig.
76. Ophthalmic Review, London.
77. Pacific Medical Journal, San Francisco.
78. Revue générale d'ophtalmologie, Paris.
79. Sanitarian, New York.
80. Therapeutic Gazette, Detroit.
81. Virginia Medical Monthly, Richmond.
82. Medical Review, St. Louis.
83. Zeitschrift für physiologische Chemie, Strassburg.
84. Wiener medizinische Wochenschrift, Vienna.
85. Texas Courier-Record, Dallas, Tex.
86. Southern Practitioner, Nashville, Tenn.
87. Revue médico-pharmaceutique, Constantinople.
88. Prager medicinische Wochenschrift, Prague.
89. Archivos de ginecol. y pediat., Barcelona.
90. Medical Chronicle, Manchester.
91. Revue de chirurgie, Paris.
92. Revue de médecine, Paris.
93. Sanitary Journal, Glasgow.
94. Archives de neurologie, Paris.
95. Archiv für Gynækologie, Berlin.
96. Annals of Surgery, Philadelphia.
97. Mesdunarodnaja klinika, Warsaw.
98. Alienist and Neurologist, St. Louis.
99. Boston Medical and Surgical Journal.
100. Gazette des hôpitaux, Paris.
101. International Journal of Surgery, New York.
102. Kansas City Medical Record, Kansas City, Mo.
103. Medical Classics, New York.
104. Maryland Medical Journal, Baltimore.
105. Northwestern Lancet, St. Paul, Minn.
106. Omaha Clinic, Omaha, Neb.
107. Pacific Record of Medicine and Surgery, San Francisco.
108. Revue de thérapeutique médico-chirurgicale, Paris.
109. St. Louis Medical and Surgical Journal, St. Louis.
110. Texas Health Journal, Dallas, Tex.
111. União médico, Rio de Janeiro.
112. University Medical Magazine, Philadelphia.
113. Wiener medizinische Presse, Vienna.
114. Zeitschrift für klinische Medizin, Berlin.
115. Western Medical Reporter, Chicago.
116. Therapeutische Monatshefte, Berlin.
117. Southern Medical Record, Atlanta.
118. Revue mensuelle des maladies de l'enfance, Paris.
119. Philadelphia Polyclinic.
120. Nashville Journal of Medicine and Surgery, Nashville, Tenn.
121. Medical Bulletin, Philadelphia.
122. L'Union médicale du Canada, Montreal.
123. Korrespondenzblatt der aertzlichen kreis- und bezirks- Vereine im Königreich Sachsen, Leipzig.
124. Anti-Adulteration Journal, Philadelphia.
125. Hall's Journal of Health, New York.
126. Revue des sciences médicales en France et à l'étranger, Paris.
127. Gazette médicale de Nantes.
128. Medical Era, St. Louis.
129. Dosimetric Medical Review, N. Y.
130. Canada Medical Record, Montreal.
131. Bristol Medico-Chirurgical Journal, Bristol, England.
132. Archives of Gynæcology, N. Y.
133. Medicinisches Correspondenz-Blatt des württembergischen ärztlichen Landesvereins, Stuttgart.
134. The Doctor of Hygiene, New York.
135. The Analyst, London.

136. *Revue de laryngologie, d'otologie et de rhinologie*, Paris.
137. *Practice*, Richmond, Va.
138. *New England Medical Monthly*, Bridgeport, Conn.
139. *Medical Standard*, Chicago.
140. *Annali de freniatria*, Torino.
141. *Herald of Health*, London.
142. *Gazette médicale de l'Algérie*, Algiers.
143. *Texas Medical Journal*, Austin, Tex.
144. *College and Clinical Record*, Philadelphia.
145. *Revista de medicina y farmacia*, Paris.
146. *Abstract of Sanitary Reports*, Washington, D. C.
147. *Occidental Medical Times*, Sacramento, Cal.
148. *Revue médico-chirurgicale des maladies des femmes*, Paris.
149. *Abstract and Index*, Weston, Vermont.
150. *Medicinishe Monatsschrift*, N. Y.
151. *Epitome of Medicine*, New York.
152. *La France médicale et Paris médical*, Paris.
153. *Journal d'hygiène*, Paris.
154. *Gazette de gynécologie*, Paris.
155. *Denver Medical Times*, Denver, Col.
156. *Chemist and Druggist*, London.
157. *Brooklyn Medical Journal*, Brooklyn.
158. *Archiv für Kinderheilkunde*, Stuttgart.
159. *Sanitary News*, Chicago.
160. *Revue médicale de Toulouse*.
161. *Pittsburgh Medical Review*, Pittsburgh.
162. *Nouvelles archives d'obstétrique et de gynécologie*, Paris.
163. *Medical Missionary Record*, New York.
164. *La tribune médicale*, Paris.
165. *Journal de l'anatomie et de la physiologie normales et pathologiques de l'homme et des animaux*, Paris.
166. *Journal of Mental Science*, London.
167. *Druggists' Bulletin*, Detroit.
168. *Gazette médicale de Strasbourg*, Strasbourg.
169. *Centralblatt für die gesammte Therapie*, Vienna.
170. *Buffalo Medical Journal*.
171. *Annales d'oculistique*, Paris.
172. *Sanitary Era*, New York.
173. *Recueil d'ophtalmologie*, Paris.
174. *Ceylon Medical Journal*, Colombo.
175. *Nice-médical*, Nice.
176. *Medical Summary*, Philadelphia.
177. *Le praticien*, Paris.
178. *Journal of Physiology*, Cambridge, England.
179. *Gaceta médica de México*.
180. *Centralblatt für die gesammte Medizin*, Leipzig.
181. *Bulletin médical du nord*, Lille.
182. *Archiv für Physiologie*, Leipzig.
183. *Sanitary Inspector*, Augusta, Me.
184. *Revue médicale de l'est*, Nancy, France.
185. *Physician and Surgeon*, Ann Arbor, Mich.
186. *Medical World*, Philadelphia.
187. *Liverpool Medico-Chirurgical Journal*, Liverpool.
188. *Journal de médecine de Bordeaux*.
189. *Gesundheit*, Frankfurt a. M.
190. *Centralblatt für praktische Augenheilkunde*, Leipzig.
191. *Journal de la santé publique*, Paris.
192. *Chicago Medical Times*.
193. *Moniteur de thérapeutique*, Paris.
194. *Bulletins et mémoires de la Société obstétricale et gynécologique*, Paris.
195. *Archives de médecine navale*, Paris.
196. *Southern Clinic*, Richmond, Va.
197. *Revue médicale de la Suisse romande*, Geneva.
198. *Progress*, Louisville, Ky.
199. *Medical Brief*, St. Louis.
200. *Sei-I-Kwai Medical Journal*, Tokyo.
201. *Journal de la Société de médecine de l'Isère*.
202. *Medical Age*, Detroit.
203. *La normandie médicale*, Rouen.
204. *Archiv für Ophthalmologie (Gräfe)*, Leipzig.
205. *Centralblatt für allgemeine Gesundheitspflege*, Bonn.
206. *Indian Medical Gazette*, Calcutta.
207. *Atlanta Medical and Surgical Journal*.
208. *Revue scientifique*, Paris.
209. *Pharmaceutische Zeitschrift für Russland*, St. Petersburg.
210. *Medico-Legal Journal*, New York.
211. *Lyon médical*, Lyons.

212. *Journal de médecine et de chirurgie pratiques*, Paris.
213. *Glasgow Medical Journal*, Glasgow, Scotland.
214. *Correspondenz-blatt für schweizer Aerzte*, Basel.
215. *Studies from the Biological Laboratory of Johns Hopkins University*, Baltimore.
216. *Albany Medical Annals*, Albany, New York.
217. *Beiträge zur Augenheilkunde*, Hamburg.
218. *Milwaukee Medical Journal*, Milwaukee, Wis.
219. *La clinique*, Bruxelles.
220. *Journal des sciences médicales de Lille*.
221. *Gazette médicale de Montréal*.
222. *Cleveland Medical Gazette*, Cleveland, Ohio.
223. *Bulletin de la Société des médecins et naturalistes de Jassy*, Roumania.
224. *American Practitioner and News*, Louisville, Ky.
225. *Le Poitou médical*, Poitiers.
226. *Archiv f. klinische Chirurgie*, Berlin.
227. *Leonard's Illustrated Medical Journal*, Detroit.
228. *La Loire médicale*, Saint-Etienne.
229. *Journal of Medicine and Dosimetric Therapeutics*, London.
230. *Gaz. médicale de Picardie*, Amiens.
231. *Cook County Hospital Reports*, Chicago.
232. *Gazette médicale d'Orient*, Constantinople.
233. *Columbus Medical Journal*, Columbus, Ohio.
234. *American Lancet*, Detroit.
235. *China Medical Missionary Journal*, Shanghai.
236. *Archives de tologie et de gynécologie*, Paris.
237. *American Journal of Pharmacy*, Philadelphia.
238. *Chemical News*, London.
239. *Indian Medical Record*, Calcutta.
240. *Virchow und Hirsch's Jahresbericht über die Fortschritte der Anatomie und Physiologie*, Berlin.
241. *Revue de l'hypnotisme et de la psychologie physiologique*, Paris.
242. *Journal of Nervous and Mental Disease*, New York.
243. *Archives de médecine et de pharmacie militaires*, Paris.
244. *L'électrothérapie*, Paris.
245. *Journal of Cutaneous and Genito-Urinary Diseases*, New York.
246. *Archiv für die Gesamte Physiologie*, Bonn.
247. *The Journal of Pathology and Bacteriology*, Edinburgh and London.
248. *Journal of Morphology*, Boston.
249. *Archives of Ophthalmology*, New York.
250. *Archives de l'anthropologie criminelle et des sciences pénales*, Paris.
251. *Annals of Hygiene*, Philadelphia.
252. *Zeitschrift für Medicinalbeamte*, Berlin.
253. *Journal d'oculistique et de chirurgie*, Paris.
254. *Archiv für Augenheilkunde*, Wiesbaden.
255. *Jäger's Monatsblatt*, Stuttgart.
256. *Journal d'accouchements*, Liège.
257. *Canada Lancet*, Toronto.
258. *Medical Temperance Journal*, London.
259. *Clinica Chirurgica*, Milan.
260. *American Monthly Microscopical Journal*, Washington, D. C.
261. *Journal of the New York Microscopical Society*, New York.
262. *Annales de l'Institut Pasteur*, Paris.
263. *American Journal of Psychology*, Worcester, Mass.
264. *Nursing Record*, London.
265. *Centralblatt für Physiologie*, Vienna.
266. *Annales des maladies des organes génito urinaires*, Paris.
267. *Australasian Medical Gazette*, Sydney.
268. *O correio médico*, Lisbon.
269. *Journal of the National Association of Railway Surgeons*, Fort Wayne, Ind.
270. *L'organe de la confraternité médicale*, Bruxelles.
271. *Biblioteka Vrachy*, Moscow.
272. *South African Medical Journal*, Cape Colony, S. A.
273. *Archiv für experimentelle Pathologie und Pharmacie*, Leipzig.
274. *Archives d'ophthalmologie*, Paris.
275. *The Scalpel*, Calcutta.
276. *Al Shifa*, Cairo.

277. *Journal of Anatomy and Physiology*, London.
278. *American Journal of Insanity*, Utica, N. Y.
279. *Medical Herald*, Louisville, Ky.
280. *Annales de la Société d'anatomie pathologique*, Bruxelles.
281. *Medical Advance*, Chicago.
282. *Montreal Medical Journal*, Montreal.
283. *Allgemeiner Wiener medizinische Zeitung*, Vienna.
284. *Maritime Medical News*, Halifax, N. S.
285. *Australian Medical Journal*, Melbourne.
286. *Archives Internationales de laryngologie, de rhinologie et d'otologie*, Paris.
287. *Annales de dermatologie et de syphiligraphie*, Paris.
288. *La presse médicale belge*, Bruxelles.
289. *Archives roumaines de médecine et de chirurgie*, Paris.
290. *La pratique médicale*, Paris.
291. *Archives de médecine et de chirurgie*, Paris.
292. *La Médecine Scientifique*, Paris.
293. *Annales de la Société médico-chirurgicales*, Liège.
294. *Bulletin de la phthisie pulmonaire*, Paris.
295. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, Berlin.
296. *Les nouveaux remèdes*, Paris.
297. *Allgemeine medicinische Central-Zeitung*, Berlin.
298. *Gazette hebdomadaire des sciences médicales*, Montpellier.
299. *Annales de chimie et de physique*, Paris.
300. *Annales de physiologie, normale et pathologique*, Paris.
301. *Deutsche Zeitschrift für Chirurgie*, Leipzig.
302. *Jahrbuch für Morphologie*, Leipzig.
303. *L'abeille médicale*, Paris.
304. *La province médicale*, Lyons.
305. *L'année médicale de Caen*.
306. *Petit moniteur de la médecine*, Paris.
307. *L'impartialité médicale*, Paris.
308. *Journal de la Société de médecine et de pharmacie de la Haute-Vienne*, Limoges.
309. *Charité-Annalen*, Berlin.
310. *Jahrbuch für praktische Aerzte*, Berlin.
311. *Vierteljahresschrift für gerichtliche Medizin und Sanitätswesen*, Berlin.
312. *Monatshefte für Ohrenheilkunde*, Berlin.
313. *Monatshefte für Anatomie und Physiologie*, Berlin.
314. *Zeitschrift für Psychiatrie und gerichtliche Medizin*, Berlin.
315. *Archiv für Pathologie und Physiologie*, Berlin.
316. *Anatomischer Anzeiger*, Jena.
317. *Centralblatt für Gynäkologie*, Leipzig.
318. *Anzeiger über Novitäten und Antiquar der Medicin*, Leipzig.
319. *Centralblatt für klinische Medizin*, Leipzig.
320. *Archiv für Anatomie und Physiologie*, Leipzig.
321. *Annales d'orthopédie*, Paris.
322. *Archiv für Anthropologie*, Braunschweig.
323. *Mittheilungen aus der ophthalmologischen Klinik in Tübingen*.
324. *Archiv für Hygiene*, Munich.
325. *American Analyst*, New York.
326. *Deutsches Archiv für klinische Medizin*, Leipzig.
327. *Journal des connaissances médicales pratiques et de pharmacologie*, Paris.
328. *Archiv für Ohrenheilkunde*, Leipzig.
329. *Journal de médecine, de chirurgie, et de pharmacologie*, Paris.
330. *Médecin clinicien*, Paris.
331. *Der praktische Arzt*, Wetzlar.
332. *Oesterreichische Badezeitung*, Vienna.
333. *Blätter für Gesundheitspflege*, Berlin.
334. *Annales de l'hospice des Quinze-Vingts*, Paris.
335. *Biologisches Centralblatt*, Erlangen.
336. *Centralblatt für Chirurgie*, Leipzig.
337. *Quarterly Journal of Inebriety*, Hartford, Conn.
338. *Jenäische Zeitschrift für Naturwissenschaften*, Jena.
339. *Detroit Emergency Hospital Reports*, Detroit.
340. *Gazette d'ophthalmologie*, Paris.
341. *Medizinisch-chirurgisches Centralblatt*, Vienna.
342. *Journal des sages-femmes*, Paris.

343. Monatsblatt für öffentliche Gesundheitspflege, Braunschweig.
344. Zeitschrift für Ohrenheilkunde, Wiesbaden.
345. Annales de thérapeutique médico-chirurgicales, Paris.
346. Annales d'hygiène publique et de médecine légale, Paris.
347. American Journal of Ophthalmology, St. Louis.
348. Nouveau Montpellier Médical, Montpellier, France.
349. Bulletin de la Société de médecine de Rouen.
350. "Hygiea." Zeitschrift für Balneologie, Climatologie, etc. Vienna.
351. Friedrich's Blätter für gerichtliche Medizin und Sanitäts-Polizei, Munich.
352. Allgemeiner deutsche Hebammen-Zeitung, Berlin.
353. Zehender's klinische Monatsblätter für Augenheilkunde, Stuttgart.
354. Der Frauenarzt, Berlin.
355. Revista de terapéutica y farmacia, Madrid.
356. Archives de biologie, Gand.
357. Therapeutische Blätter, Vienna.
358. Journal de chimie médicale, de pharmacie, de toxicologie et revue de nouvelles scientifiques, nationales et étrangères, Paris.
359. Journal de Pharmacie et de chimie, Paris.
360. Archives générales de médecine, Paris.
361. Annales médico-psychologiques, Paris.
362. Répertoire de pharmacie, Paris.
363. Gazette hebdomadaire de médecine et de chirurgie, Paris.
364. Medical Fortnightly, St. Louis.
365. Centralblatt für die medicinischen Wissenschaften, Berlin.
366. Jahrbuch für Kinderheilkunde und physische Erziehung, Leipzig.
367. Irrenfreund, Heilbronn.
368. Archiv für Psychiatrie und Nervenkrankheiten, Berlin.
369. Norsk magazin for lægevidenskaben, Christiania.
370. Hygiea, Stockholm.
371. Nordiskt medicinskt arkiv, Stockholm. [sala.]
372. Lakäreförenings förhändlingar, Upsala.
373. Hospitals-tidende, Copenhagen.
374. Bibliothek for læger, Copenhagen.
375. Ugeskrift for læger, Copenhagen.
376. Lo sperimentale, Florence.
377. Gazeta médica de Granada.
378. Gazette médicale de Liège.
379. Braithwaite's Retrospect, New York and London.
380. Giornale per le levatrici, Milan.
381. Morphologisches Jahrbuch, Leipzig.
382. Wiener Klinik, Vienna.
383. Memorabilien, Heilbronn.
384. Good Health, Battle Creek, Mich.
385. Monatsschrift für Ohrenheilkunde, Berlin.
386. Deutsche Vierteljahresschrift für öffentliche Gesundheitspflege, Braunschweig.
387. Jahresbericht über Leistungen und Fortschritte der Ophthalmologie, Tübingen.
388. British Guiana Medical Annual and Hospital Reports, Georgetown.
389. Bulletin de la Société d'ethnographie, Paris.
390. Deutsches Wochenblatt für Gesundheitspflege und Rettungswesen, Berlin.
391. Zeitschrift für Biologie, Munich.
392. Medizinisch-chirurgisches Rundschau, Vienna.
393. Zeitschrift für Geburtshilfe und Gynäkologie, Stuttgart.
394. Health, Belfast, Ireland.
395. Jahrbuch für Psychiatrie, Berlin.
396. Archiv der Pharmacie, Berlin.
397. Klinische Zeit- und Streitfragen, Vienna.
398. Journal of the Anthropological Institute of Great Britain and Ireland, London.
399. Medicinische Neuigkeiten für praktische Aerzte, Munich.
400. Journal of the Royal Microscopical Society, London.
401. Zeitschrift für wissenschaftliche Mikroskopie und für mikroskopische Technik, Braunschweig.
402. Jahresbericht über Leistungen und Fortschritte der gesamten Medicin. Virchow and Hirsch, Berlin.
403. Mind, London.
404. Volkmann's Sammlung klinischen Vorträge, Leipzig.
405. Zeitschrift für Heilkunde, Berlin.

406. *Medizinische Jahrbücher der Gesellschaft der Aerzte in Wien.*
407. *Sanitary Record*, London.
408. *St. Bartholomew's Hospital Reports*, London.
409. *Archives italiennes de biologie*, Turin.
410. *Archives de physiologie normale et pathologique.* Brown-Séguard, Paris.
411. *Der aerztliche Practiker*, Berlin.
412. *St. George's Hosp. Reports*, London.
413. *L'Art médical*, Paris.
414. *Bulletin de la clinique nationale ophthalmologique de l'hospice des Quinze Vingt*, Paris.
415. *Courrier médical*, Paris.
416. *L'électricien*, Paris.
417. *Aerztliches Vereinsblatt für Deutschland*, Leipzig.
418. *St. Thomas's Hospital Reports*, London.
419. *Bulletins et mémoires de la Société de chirurgie*, Paris.
420. *Bulletins et mémoires de la Société médicale des hôpitaux*, Paris.
421. *Bulletins et mémoires de la Société française d'otologie et de laryngologie*, Paris.
422. *Shurnal akusherstva i shenskich bolesnej*, St. Petersburg.
423. *Royal London Ophthalmic Hospital Reports*.
424. *Clinical Reporter*, Chicago.
425. *American Annals of the Deaf*, Washington, D. C.
426. *Ohio Medical Journal*, Cincinnati.
427. *Bulletin de la Société de médecine d'Angers*.
428. *Gny's Hospital Reports*, London.
429. *Veröffentlichungen des kaiserlichen Gesundheitsamtes*, Berlin.
430. *Kansas Medical Catalogue*, Fort Scott, Kansas.
431. *Journal du magnétisme*, Paris.
432. *Journal of Comparative Medicine and Veterinary Archives*, Phila.
433. *Concours médical*, Paris.
434. *Gazette des Eaux*, Paris.
435. *Revue clinique d'oculistique*, Paris.
436. *Journal of Heredity*, Chicago.
437. *Schweizerische Blätter für Gesundheitspflege*, Basel.
438. *Gazette française de médecine et de pharmacie*, Paris.
439. *Revue obstétricale et gynécologique*, Paris.
440. *The Microscope*, Trenton, N. J.
441. *Revista de sanidad militar*, Madrid.
442. *Gazette médicale et pharmaceutique de France*.
443. *Revue d'hygiène et de police sanitaire*, Paris.
444. *Journal of Surgery, Gynecology, and Obstetrics*, Atlanta.
445. *Zeitschrift für Schulgesundheitspflege*, Hamburg.
446. *Revue speciale de l'antisepsie médicale et chirurgicale*, Paris.
447. *Revue d'anthropologie*, Paris.
448. *Aerztlicher Central-Anzeiger*, Hamburg.
449. *Archives d'anatomie pathologique*, Paris.
450. *Bulletin de la Société clinique*, Paris.
451. *International Medical Magazine*, Philadelphia.
452. *Nouvelle iconographie de la Salpêtrière*, Paris.
453. *Annales de la reale Academia de ciencias medicas fisicas y naturales de la Habana*.
454. *Archives médicales belges*, Bruxelles.
455. *Bulletin de la Société de médecine de Gand*.
456. *Revista de ciencias medicas*, Barcelona.
457. *Archives de médecine expérimentale et d'anatomie pathologique*, Paris.
458. *Archivo de la Sociedad de Estudios Clinicas*, Madrid.
459. *Cronica médico quirúrgica de la Habana*.
460. *Archivio per le scienze mediche*, Torino.
461. *Archivii italiani di laringologia*, Naples.
462. *The Post-Graduate*, New York.
463. *Annales de obstetricia ginecopatía y pediatria*, Madrid.
464. *Revista di ostetricia e ginecologia*, Torino.
465. *Der Thierarzt*, Wetzlar.
466. *Archivio di ortopedia*, Milan.
467. *Bulletin de la Société royale de pharmacie de Bruxelles*.
468. *Revista d'igiene practica e sperimentale*, Naples.

469. Boston Journal of Health.
470. Annali clinici dell' Ospedale degli Incurabili in Napoli.
471. Bulletins de la Société de médecine pratique, Paris.
472. Bollettino delle scienze mediche, Bologna.
473. American Druggist, New York.
474. Cronaca del manicomio di Ancona.
475. Berliner Klinik, Berlin.
476. Dominion Med. Monthly, Toronto.
477. Annali di chimica e di farmacologia, Milan.
478. Bulletin du service de santé militaire, Paris.
479. Journal des maladies cutanées et syphilitiques, Paris.
480. Annali universali di medicina e chirurgia, Milan.
481. Boletín de medicina y farmacia, Barcelona.
482. Canadian Pharmaceutical Journal, Toronto.
483. The Climatologist, Philadelphia.
484. Bollettino della reale Accademia medica di Roma.
485. Archivio di patologia infantil, Naples.
486. China Imperial Maritime Customs Medical Reports, Shanghai.
487. Correspondenzblatt des allgemeinen mecklenburgischen Aerztevereins, Rostock.
488. Archiv for Pharmaci og teknisk Chemi, med deres Grundvidenskaber, Copenhagen.
489. El Dictamen, Madrid.
490. Atti e rendiconti della Accademia medico-chirurgica di Perugia.
491. Journal de micrographie, Paris.
492. Baltimore Med. and Surg. Record.
493. El observador médico, Madrid.
494. Gaceta médica catalana, Barcelona.
495. Deutsche militärärztliche Zeitschrift, Berlin.
496. Correspondenzblätter des allgemeinen ärztlichen Vereins von Thüringen, Leipzig.
497. Il Morgagni, Milan.
498. Finska Läkare-sällskapets handlingar, Helsingfors.
499. Journal of Microscopy and Natural Science, London.
500. Boletín de la Revista de medicina y cirugía prácticas, Madrid.
501. Bollettino d'oculistica, Florence.
502. Der Naturarzt, Dresden.
503. El siglo médico, Madrid.
504. Journal of Hydrotherapy, London.
505. Gazzetta degli ospitali, Naples.
506. Journal of the Arkansas Medical Society, Little Rock.
507. Giornale italiano delle malattie veneree e della pelle, Milan.
508. Skandinavisches Archiv für Physiologie, Upsala.
509. Ejenedelnaya klinicheskaya Gazeta.
510. Alma Mater, Aberdeen, Scotland.
511. Blätter für Kriegsverwaltung, Berlin.
512. Gyógyászat, Budapest.
513. Il progresso medico, Naples.
514. Ohio Journal of Dental Science, Toledo.
515. Gazzetta medica di Roma.
516. La independencia médica, Barcelona.
517. Vaccination Enquirer and Health Review, London.
518. Bollettino della Commissione speciale d'igiene del municipio di Roma.
519. Journal of Materia Medica, New Lebanon, N. Y.
520. Gazeta lekarska, Warsaw.
521. Journal of Comparative Pathology and Therapeutics, Edinburgh.
522. Bollettino medico cremonese, Cremona.
523. Kinesithérapie, Paris.
524. La médecine contemporaine, Paris.
525. Zeitschrift der Tokio medicinischen Gesellschaft, Tokyo.
526. Giornale della reale Società italiana d'igiene, Milan.
527. Bulletins et mémoires de la Société de thérapeutique, Paris.
528. L'écho médical, Toulouse.
529. Bulletins et mémoires de la Société française d'ophtalmologie, Paris.
530. Meditzinskoje Obozrenije, Warsaw.
531. Giornale medico del reale esercito e della reale marina, Roma.
532. Les nouveaux-nés, Paris.
533. Medical and Professional Review, London.
534. Gaceta de oftalmologia y de otología, etc., Madrid.
535. La médecine illustrée, Paris.
536. Medical Reformer, Agra City, India.

537. *Giornale internazionale delle scienze mediche*, Naples.
538. *Le Scalpel*, Liège.
539. *Bulletins de la Société anatomique de Nantes*.
540. *L'Osservatore*, Torino.
541. *Aerztliche Mittheilungen aus Baden*, Karlsruhe.
542. *La crónica médica*, Lima.
543. *Bulletin de la Société anatomo clinique de Lille*.
544. *La correspondencia médica*, Madrid.
545. *Ciencia médico-escolástica*, Barcelona.
546. *Cincinnati Medical Journal*, Cincinnati.
547. *Massachusetts Medical Journal*, Boston.
548. *Clinical Register*, Knoxville, Tenn.
549. *A medicina contemporanea*, Lisbon.
550. *Cronaca del manicomio di Siena*.
551. *Medycyna*, Warsaw.
552. *Clinique*, Chicago.
553. *El progreso médico-farmacéutico*, Madrid.
554. *Ottawa Medical World*.
555. *Meditzinisko Spisanič*, Budapest.
556. *National Druggist*.
557. *New Zealand Medical Journal*, Dunedin.
558. *O Brazil-medico*, Rio de Janeiro.
559. *Orvosi hetilap*, Budapest.
560. *Pharmaceutische Post*, Vienna.
561. *Quarterly Therapeutic Review*, London.
562. *Pharmaceutical Era*, Detroit.
563. *Orvosi heti szemle*, Budapest.
564. *Progrèsul médical roumain*, Bucharest.
565. *Quarterly Journal of Medical Science*, London.
566. *Revista practica de pediatria*, Madrid.
567. *Sanitary Engineering*, London.
568. *Medical Herald*, St. Joseph, Missouri.
569. *Przegląd lekarski*, Krakow.
570. *Quarterly compendium of Medicine*, Philadelphia.
571. *Russkaia meditzina*, St. Petersburg.
572. *Tidsskrift for praktisk medicin*, Christiania.
573. *Therapeutica medica*, Naples.
574. *El restaurador farmacéutico*, Barcelona.
575. *Pharmaceutische Centralhalle für Deutschland*, Berlin.
576. *Gesundheits-Ingenieur*, Munich.
577. *Union médicale du nord-est*, Reims.
578. *Revista médica de Chile*, Santiago, Chili.
579. *Vereinsblatt der pfaelzischen Aerzte*, Frankenthal.
580. *Revue sanitaire de la Province*, Bordeaux.
581. *Pharmaceutical Record*, London.
582. *Journal da Sociedade das sciencias medicas de Lisbon*.
583. *Nederlandsch Tijdschrift voor Geneeskunde*, Amsterdam.
584. *World's Medical Review*, Phila.
585. *Revue scientifique et administrative des médecins des armées de terre et de mer*, Paris.
586. *Wratsch*, St. Petersburg.
587. *Répertoire de thérapeutique*, Paris.
588. *Wiadomosci lekarskie*, Lwow.
589. *Riforma medica*, Naples.
590. *Wjestnik klinitscheskoj i ssudebnoj psichiatrii i neiropatologii*, St. Petersburg.
591. *Rivista sperimentale di freniatria e di medicina legale in relazione con l'antropologia e le scienze giuridiche e sociali*, Reggio-Emilia.
592. *Zeitschrift für die Behandlung Schwachsinniger und Epileptischer*, Dresden.
593. *Kjobenhavenske medicinske selskabs förhandlingar*, Copenhagen.
594. *Revista veneta di scienze mediche*, Venice.
595. *Zeitschrift für Geburtshülfe und Frauenkrankheiten*, St. Petersburg.
596. *Rivista clinica e terapeutica*, Naples.
597. *Bulletin de la Société médicale de l'Yonne*, Auxerre.
598. *Zeitschrift für Wundärzte und Geburtshülfer*, Heggach.
599. *L'actualité médicale des sciences médicales et des intérêts professionnels*, Paris.
600. *Mittheilungen für den Verein Schleswig Holsteinischer Aerzte*, Kiel.
601. *Rivista clinica. Archivio italiano di clinica medica*, Milan.
602. *American Anthropologist*, Washington, D. C.
603. *Revue d'anthropologie*, Paris.

604. Il raccoglitore medico, Forli.
605. Archivio di psichiatria, scienze penali ed antropologia criminale, Torino.
606. L'Homme, Paris.
607. Revista especial de oftalmologia, sifilografia y dermatologia, Madrid.
608. Revue internationale scientifique et populaire des falsifications des denrées alimentaires, Amsterdam.
609. Archiv für Anatomie und Entwicklungsgeschichte, Leipzig.
610. La medicina contemporánea, Madrid.
611. Medical Current, Chicago.
612. Archivos de medicina y cirugía de los niños, Madrid.
613. Revista Balear de ciencias médicas, Palma de Mallorca.
614. Giornale di farmacia, di chimica e di scienze affini, Torino.
615. La rassegna di scienze mediche, Modena.
616. Gazzetta medica lombarda, Milan.
617. Indian Medical Journal, Calcutta.
618. Crónica médica de Valencia.
619. Revista médico-farmacéutico de Aragón, Zaragoza.
620. El monitor médico, Lima.
621. Ejenedelnaya, St. Petersburg.
622. Pester medicinisch-chirurgische Presse, Budapest.
623. Der Militärarzt, Vienna.
624. Bollettino delle malattie dell' orecchio, della gola e del naso, Florence.
625. Gazzetta di medicina publica, Naples.
626. Annales de la Société d'hydrologie médicale de Paris.
627. Mittheilungen aus der Vereins der Aerzte in Steiermark, Graz.
628. Bollettino delle cliniche, Milan.
629. La medicina preventiva; Gazzetta mensile d'igiene clinica e terapia, Naples.
630. Coimbra médica, Coimbra.
631. Minnesota Med. Monthly, St. Paul.
632. Revista de medicina y cirugía prácticas, Madrid.
633. Revista de laringologia, otologia y rinologia, Barcelona.
634. Revista médica de Sevilla.
635. Revista dos cursos practicos et theoreticos da Faculdade de medicini do Rio de Janeiro.
636. Dnevnik obshestva vrachei pri Imperatorskom Kazanskom Universitetie, Kazan.
637. Annali della Università libera di Perugia.
638. Revista Médica de Bogotá.
639. Revista argentina de ciencias médicas, Buenos Ayres.
640. Kronika lekarska, Warsaw.
641. Annales de la Société de médecine d'Anvers.
642. Gazeta medica da Bahia.
643. Revue médicale, Paris.
644. Semskij wratsch, Tchernigoff.
645. Texas Sanitarian, Austin, Texas.
646. Doctor's Weekly, New York City, N. Y.
647. Alabama Medical and Surgical Age, Anniston.
648. Journal des Sociétés scientifiques de la France et de l'étranger, Bordeaux.
649. Zeitschrift der Bakterienkunde, Leipzig.
650. Wiener medicinische Blätter, Vienna.
651. Mittheilungen aus der medicinischer klinik zu Königsberg.
652. Giornale di neuropatologia, Naples.
653. La médecine russe, St. Petersburg.
654. Revista de médico-farmacéutica, Castellón.
655. Bolletino della Poliambulanza di Milano.
656. Revista Brasileira de medicina, Rio de Janeiro.
657. International Review of Medical and Surgical Technics, Palatka, Fla.
658. Bulletin international des Sociétés de la Croix Rouge, Geneva.
659. Vóz de Hipocrates, Mexico.
660. Spitalul, Bucharest.
661. Annales da Academia de medicina do Rio de Janeiro.
662. Revista médico-quirúrgica, Buenos Ayres.
663. Medical Mirror, St. Louis.
664. Moniteur du praticien, Paris.
665. El progreso ginecologia y pediatria, Valencia.
666. Revista de medicina cirugía y farmacia, Barcelona.
667. Journal de pharmacie e chimica, Lisbon.

668. Medical Visitor, Chicago.
669. Memorie della reale Accademia medica di Genova.
670. Mémoires de la Société de médecine de Nancy.
671. Revue médicale de Moscou.
672. Der Fortschritt, Geneva.
673. Universal Medical Journal, Philadelphia.
674. Le mouvement hygiénique, Brussels.
675. Mitth. a. d. anthrop. Gesell., Wien.
676. Osaka Medical Journal, Japan.
677. Japanese and Foreign Medical News, Tokyo.
678. Eira, Stockholm.
679. Centralblatt für Kinderheilkunde, Leipzig.
680. Revue Inter. de Rhinol., d'Otol., de Laryngol. et d'Ophthal., Paris.
681. Mittheilungen aus der medicinischen Facultät der kaiserlich-Japanischen Universität, Tokyo.
682. Entomologisk Tijdskrift, Stockholm.
683. Novosti Terapii, Budapest.
684. Annales de la Société de Médecine de Gand.
685. Bulletin de la Société de médecine mentale de Belgique, Gand.
686. Commentario clinico delle Malattie cutanee e Genito Urinarie, Siena, Italy.
687. Journal of the Army Medical Society, Japan.
688. Psychiatrische Bladen, Amsterdam.
689. Reports of the Psychical Research Society, London.
690. Bulletin de la Société de psychologie physiologique, Paris.
691. Revue illustrée de polytechnique médicale, Paris.
692. The Hospital, London.
693. Revue de la masso-électrothérapie, Paris.
694. Public Health, London.
695. Hospital Gazette, London.
696. Chirurgicheskij vestnik, St. Petersburg.
697. British Journal of Dermatology, London.
698. Chemiker Zeitung, Berlin.
699. Revista clinica de Barcelona.
700. Revue micologique, Paris.
701. Zoologischer Anzeiger, Leipzig.
702. Kozegészségügy és törvényszéki orvostoi, Budapest.
703. Vestnik obschtschestvennoj gigeny, ssudebnoj i praktitscheskoj medizini, Moscow.
704. Vestnik oftalmologii, St. Petersburg.
705. Journal ophtalmologique du Nord, Lille.
706. Bulletin de statistique démographique et médicale de Bruxelles.
707. Journal de pharmacie d'Anvers.
708. Bulletin de la Société anatomo-pathologique de Bruxelles.
709. Bulletin de la Société belge de microscopie, Bruxelles.
710. Bulletin de la Société royale de médecine publique de Belgique, Bruxelles.
711. American Journal of Dental Science, Baltimore.
712. Bulletins et publications de la Société de médecine du Luxembourg.
713. Bulletin de la Société de médecine de Reims.
714. Archivio Bizzozzero, Naples.
715. Bulletin de la Société de médecine du département de la Sarthe.
716. Los Avisos, Madrid.
717. Bulletins et publications de l'Académie des Sciences de Belgique, Brussels.
718. Bulletin de l'Institut de Statistique, Paris.
719. Western Druggist, St. Louis.
720. Revue internationale de l'électrothérapie, Paris.
721. Dental Headlight, Nashville.
722. Jahresbericht über die Fortschritte der Geburtshilfe und Gynäkologie, Erlangen.
723. The Medical Pioneer, Enfield, England.
724. Gynäkologisches Centralblatt, Berlin.
725. Moniteur d'ophtalmologie, St. Petersburg.
726. Vestnik oftalmologii, St. Petersburg.
727. Annali dell' Istituto d'igiene sperimentale dell' Università di Roma.
728. Manhattan Eye and Ear Hospital Reports, New York.
729. Transcaucasian Lying-in Hospital Reports.
730. Bollettino scientifico, Pavia.
731. Wiener medicinisches Jahrbuch, Vienna.

732. Rivista clinica dell' Università di Napoli.
733. Annales de médecine thermale, Paris.
734. Australasian Journal of Pharmacy, Melbourne.
735. La médecine hypodermique, Scéaux.
736. Il Sordomuto, Naples.
737. L'Anomalo. Gazzettino antropologico psichiatrico, medico-legale, Naples.
738. Centralblatt für orthopädische Chirurgie und Mechanik, Berlin.
739. Giornale della reale Accademia di medicina, Torino.
740. Archiv für Wissenschaften und praktische Thierheilkunde, Leipzig.
741. Ephemeris, Brooklyn.
742. Apotheker-Zeitung, Berlin.
743. Het Maandblad voor Apothekers, Amsterdam.
744. Pharmaceutical Journal and Transactions, London.
745. Zubovratचेbnyi Vestnik, St. Petersburg.
746. Bulletins des travaux de la Société de pharmacie de Bordeaux.
747. L'Union pharmaceutique, Paris.
748. Zeitschrift für Krankenpflege, Bern.
749. Bulletin de la Société d'anthropologie de Paris.
750. Giornale fiorentina d'igiene, Florence.
751. Bulletin de la Société de biologie, Paris.
752. The Amer. Doctor, Richmond, Va.
753. Deutsche Zeitschrift für praktische Medizin, Berlin.
754. Wojenno Ssanitasnoje, St. Petersburg.
755. Archives générales d'hydrologie, de climatologie et de balnéothérapie, Paris.
756. Fort Wayne Journal of Medical Science.
757. Giornale di medicina pubblica, Naples.
758. Časopis lékařů českých, Praha.
759. American Journal of Chemistry.
760. Times and Register, Philadelphia.
761. Beiträge zur klinischen Chirurgie, Tübingen.
762. Archivio italiano di pediatria, Naples.
763. Archives de Sociologie, Paris.
764. Johns Hopkins Hospital Bulletin, Baltimore.
765. La salute pubblica, Perugia.
766. Studies in Clinical Medicine, Edinburgh.
767. La Medicina practica, Madrid.
768. Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie, Freiburg i. B.
769. Dominion Dental Journal, Montreal.
770. Meditzinskoie Pregläd, Budapest.
771. Hot Springs Medical Journal, Hot Springs, Ark.
772. La Sicilia médica, Palermo.
773. Revista de ciencias médicas, Havana.
774. Boletín de medicina y cirugía, Madrid.
775. Mittheilungen der naturforschenden Gesellschaft in Bern.
776. Journal of Ophthalmology, Otology, and Laryngology, New York.
777. Szemézet, Budapest.
778. Nordisk ophthalmologisk Tijdskrift, Copenhagen.
779. North Amer. Practitioner, Chicago.
780. Annales de la Polyclinique de Bordeaux.
781. L'odontologie, Paris.
782. Journal d'électricité médicale, Paris.
783. Nowiny lekarske, Posen.
784. Revista médica de México.
785. El tula médica de Valladolid.
786. St. Louis Clinique.
787. Lehigh Valley Medical Magazine, Easton, Pa.
788. Il Progreso de gynecologia y pediatria, Madrid.
789. Le progrès dentaire, Paris.
790. Nederlandsch Tijdschrift voor Verloskunde en Gynæcologie, Haarlem.
791. Γαληνός' Αθήναι.
792. El Estudio, Mexico.
793. Journal of the Quekett Microscopical Club, London.
794. Memorie della reale Accademia della scienze dell' Istituto di Bologna.
795. La cellule, Brussels.
796. Archives de zoologie expérimentale et générale, Paris.
797. Alger médical, Algiers.
798. Revue mensuelle des maladies des yeux, Paris.
799. Zeitschrift für Ethnologie, Berlin.

800. Mediizinskija pribawlenija k morskomu sborniku, Moscow.
801. Kansas Medical Journal, Topeka.
802. Lo spallansani, Rome.
803. Internationale Monatsschrift für Anatomie und Physiologie, Leipzig.
804. Monatsschrift des Vereins deutscher Zahnkünstler, Leipzig.
805. Dental Cosmos, Philadelphia.
806. Archives of Surgery, London.
807. Journal für Zahnheilkunde, Berlin.
808. International Dental Journal, Philadelphia.
809. Zeitschrift für angewandte Chemie, Berlin.
810. Quarterly Journal of Microscopical Science, London.
811. Toledo Medical and Surgical Reporter, Toledo, Ohio.
812. Biologiska föreningens förhandlingar, Stockholm.
813. Mississippi Med. Monthly, Meridian.
814. American Medico-Surgical Bulletin, New York.
815. Sanitary World, London.
816. Bollettino della Società fiorentina d'igiene, Florence.
817. Canada Health Journal, Ottawa.
818. Journal of British and Foreign Health Resorts, London.
819. La terapia moderna, Padua.
820. Medical Sentinel, Portland, Oregon.
821. Revista médico-quirurgica, Cadiz.
822. Southern Dental Journal, Atlanta.
823. Archivio della riforma medica, Naples.
824. Quarterly Medical Journal, Sheffield, England.
825. Annales des sciences psychiques, Paris.
826. Notes on New Remedies, New York.
827. Le mercredi médical, Paris.
828. Untersuchungen aus dem physiologischen Institut der Universität, Halle.
829. Pharmaceutical Journal of Australasia, Sydney, N. S. W.
830. Revista internazionale d'igiene, Naples.
831. Revista de higiene y policia sanitaria, Barcelona.
832. Sbornik lékařský, Praz. Archives bohêmes de médecine.
833. L'anthropologie, Paris.
834. La psichiatria, Naples.
835. Revista de medicina dosimetrica, Madrid.
836. Annalen der Physik und Chemie, Leipzig.
837. Zeitschrift für Nahrungsmittel-Untersuchungen und Hygiene, Vienna.
838. Duodecim, Helsinki.
839. Bollettino della Società Lancisiana, Rome.
840. Bulletin de la Société impériale des naturalistes, Moscow.
841. British Journal of Dental Science, London.
842. Journal of the British Dental Association, London.
843. Journal de médecine pratique, Paris.
844. Oesterr-ungar. Centralblatt für die medicinischen Wissenschaften, Vienna.
845. Medical Magazine, Lahore, India.
846. Harper Hospital Bulletin, Detroit.
847. Der oesterreichische Sanitäts-Beamte, Vienna and Berlin.
848. Mémoires couronnés et autres mémoires publiés par l'Académie royale de médecine de Belgique, Bruxelles.
849. Quarterly Atlas of Dermatology, St. Louis.
850. Northwestern Medical Journal, Minneapolis.
851. Wojenno meditzinskij shurnal.
852. Laitopisj chirurgitscheskago obschestwa, Moscow.
853. Revue d'orthopédie, Paris.
854. Centralblatt für allgemeine Pathologie und pathologische Anatomie, Freiburg i. B.
855. Modern Medicine and Bacteriological World, Battle Creek, Mich.
856. Western Medical and Surgical Reporter, St. Joseph, Mo.
857. Annales de la Asistencia Publica, Buenos Ayres.
858. Johns Hopkins Hospital Reports, Baltimore.
859. Bolnitchnaja gazeta Botkina.
860. Revue générale des sciences pures et appliquées, Paris.
861. Oesterreichische aerztliche Vereinszeitung, Vienna.
862. Bulletin médical de l'Algérie.
863. Der Kinder-Arzt, Worms.
864. American Medical Journal, St. Louis.

865. Bulletin de la Société française de dermatol. et de syphiligraphie, Paris.
866. Review of Insanity and Nervous Disease, Wauwatosa, Wis.
867. Kowalewskij's Archiv.
868. Journal de médecine, de chirurgie, et de pharmacologie, Bruxelles.
869. American Chem. Jour., Baltimore.
870. Balneologisches Centralblatt, Munich.
871. El criterio médico, Madrid.
872. Farmacia moderna, Madrid.
873. Il faro médico, Milan.
874. Gazette des Hôpitaux de Toulouse.
875. Helsovännan. Tidskrift för allmän och enskild helsovård, Göteborg.
876. L'idrologia e la climatologia medica, Florence.
877. Klinicheskij sbornik gositalnoi terapevticheskii kliniki imperatorskago Varschavskago Universiteta. Nabloudenija i izsledovanija, Warsaw.
878. New England Med. Gazette, Boston.
879. Revue d'hygiène thérapeutique, Paris.
880. Zeitschrift für analytische Chemie, Wiesbaden.
881. Zeitschrift für Fleisch- und Milchhygiene, Berlin.
882. Wiadomosci farmaceutyczne, Warsaw.
883. Diario del San Benedetto in Pesaro.
884. Tidskrift i militär Helsovård, Stockholm.
885. Sanitarnoe Dielo. Organ obchestvennoi i chastno higienij, St. Petersburg.
886. Rassegna critica internazionale delle malattie del naso, gola e orecchio, Naples.
887. Pamietnik towarzystwa lekarskiego Warszawskiego, Warsaw.
888. Das oesterreichische Sanitätswesen, Vienna.
889. New York Medical Times, N. Y.
890. American Ophthalmological Monographs, Cincinnati.
891. Maandblad uitgegeven door de Vereeniging tegen de Kwakzalverij, Amsterdam.
892. Journal of the Anthropological Society of Bombay.
893. Le petit médecin des familles, Paris.
894. Anales de la Academia de medicina de Medellín.
895. Le Dauphiné médical, Grenoble.
896. Journal de médecine et de pharmacie de l'Algérie, Algiers.
897. Zeitschrift für Psychologie und Physiologie der Sinnesorgane, Hamburg.
898. Toledo Med. Compend, Ohio.
899. Sbornik rabot hygienicheskoi laboratorii Moskovskago Universiteta, Moscow.
900. Rivista generale italiana di clinica medica, Pisa.
901. Medical Times and Gazette, London.
902. Journal für praktische Chemie, Leipzig.
903. Schweizerische Wochenschrift für Pharmacie, Schaffhausen.
904. Bulletin de la Société impériale et centrale de médecine vétérinaire.
905. La Clinique Internationale, Paris.
906. Journal of Balneology, New York.
907. Revista clinica de los hospitales, Madrid.
908. Bulletin de la Société de chirurgie, Paris.
909. Revue odontologique, Paris.
910. Oesterreichisch-ungarische Vierteljahresschrift für Zahnheilkunde, Vienna.
911. New York Journal of Gynecology and Obstetrics.
912. Dental Record, London.
913. Archivio per l'anthropologia e la etnologia, Florence.
914. Jour. of Electro-Therapeutics, N. Y.
915. Rivista d'igiene e sanità pubblica con Bollettino sanitario, amministrativo compilato sugli atti ufficiali del ministero dell' interno, Rome.
916. Anales de la real Academia de medicina, Madrid.
917. Boletin de medicina naval, Madrid.
918. Arch. internacionales de laringologia, otologia, rinologia, Barcelona.
919. Deutsche Revue, Breslau and Berlin.
920. Comptes rendus hebdomadaires des séances de l'Académie des sciences, Paris.
921. Il políclinico, Rome.
922. Correspondenzblatt der Aerztekammer und der Aerztevereine der Provinz Brandenburg und des Stadtkreises, Berlin.
923. Semanario farmacéutico, Madrid.

924. Reichs-Medicinal-Anzeiger, Leipzig.
925. Anales del circulo medico argentino, Buenos Ayres.
926. Beiträge zur Kinderheilkunde aus dem I. öffentlichen Kinderkrankeneninstitut in Wien.
927. Comptes rendus hebdomadaires des séances et mémoires de la Société de biologie, Paris.
928. Studies from the Laboratory of Physiological Chemistry, Sheffield Scientific School of Yale College, New Haven, Conn.
929. Repertorio medico-farmacéutico y de ciencias auxiliares, Havana.
930. Hygien Rundschau, Königsberg i. P.
931. Gaceta sanitaria de Barcelona.
932. Journal der pharmacie von Elsass-Löthringen, Strassburg.
933. Onderzoekingen gedán in het physiologisch Laboratorium, der Leidse Hoogeschool, Leiden.
934. Rivista italiana di terapia e igiene, Piacenza.
935. Andalucia médica, Cordova.
936. Bollettino della Associazione medica lombarda, Milan.
937. Revue biologique du nord de la France, Lille.
938. Onderzoekingen gedán in het physiologisch Laboratorium der Utrecht'sche Hoogeschool, Utrecht.
939. Revista de enfermedades de la infancia, Barcelona.
940. L'Orosi. Giornale di chimica, Florence.
941. Journal de pharmacologie, Bruxelles.
942. Gazette médico-chirurgicale de Toulouse.
943. Annali di ostetricia e ginecologia, Milan.
944. Bollettino dell' Associazione nazionale dei medici comunali, Rome.
945. Bulletin de pharmacie de Lyon, Lyons.
946. Dietetic and Hygienic Gazette, New York.
947. Bollettino farmaceutico, Rome and Milan.
948. California Med. Jour., San Francisco.
949. Chemisches Centralblatt, Leipzig.
950. Maandblad tegen de vervalschingen, Amsterdam.
951. Medicina científica basada en la fisiología y en la experimentación clínica, Mexico.
952. Revista farmacéutica, Buenos Ayres.
953. Pharmaceutische Zeitung, Berlin.
954. Nederlandsch militair geneeskundig Archief van de Landmacht, Zeemacht, het Oost- end West-Indisch Leger, Leiden.
955. Archives néerlandaises des sciences exactes et naturelles, Haarlem.
956. Bollettino del manicomio provinciale di Ferrara.
957. Gazzetta delle cliniche, Naples.
958. Archiv für öffentliche Gesundheitspflege in Elsass-Löthringen, Strassburg.
959. Revue d'hypnologie théorique et pratique, Paris.
960. Physiological Laboratory, Harvard Medical School, Boston.
961. Organ der Taubstumm-Anstalten in Deutschland und den deutschredenden Nachbarländern, Friedburg.
962. Bollettino della reale Accademia medico-chirurgia di Napoli.
963. Correo médico castellano, Salamanca.
964. Gazzetta del manicomio della provincia di Milano in Mombello.
965. Wochenschrift für Thierheilkunde und Viehsucht, Munich.
966. Physio-Medical Journ., Indianapolis.
967. Ny pharmaceutisk Tidende, Copenhagen.
968. Monthly Sanitary Record, Columbus, Ohio.
969. Kriegerheil. Organ der deutschen Vereine zur Pflege im Felde verwundeter und erkrankter Krieger, Berlin.
970. Journal da Sociedade pharmaceutica lusitana, Lisbon.
971. Il manicomio moderno. Giornale di psichiatria, Nocera Inferiore.
972. Gyógyyszereszi hetilap, Budapest.
973. Fraternidad médico-farmacéutica, Alicante.
974. Il monitore terapeutico. Raccolta mensile di rimedi nuovi e ricette, Naples.
975. Bollettino della Società d'igiene della provincia di Reggio Calabria.
976. Index Medicus, Detroit.
977. El progreso medico, Havana.
978. Freies hygienisches Blatt, Vienna.
979. Gynækologiske og obstetriciske Meddelelser, Copenhagen.

980. Il *Pisani*. Gazzetta sicula di freniatria e scienze affini, Palermo.
981. Johns Hopkins University Circulars, Baltimore.
982. Monitore medico marchigiano. Bollettino dell' Associazione medica marchigiana, Loreto.
983. Cronaca del regio manicomio di Alesandria.
984. Bulletin de la Société d'anthropologie de Bruxelles.
985. Bollettino della Società italiana dei microscopisti, Acireale.
986. Czasopismo towarzystwa aptekarskiego, Lwow.
987. Geneeskundige Courant voor het Koninkrijk der Nederlanden, Tiel.
988. Western Mental Journal, Kansas City, Mo.
989. Il Segno. Revista mensile di semeiologia e patologia speciale medica, Florence.
990. Medicinische Revue nebst Curorte-Zeitung, Karlsbad.
991. Russkii estestvoispytatelei i vrachei, St. Petersburg.
992. De praktizeerende Geneesheer, Her-togenbosch.
993. Bulletin de la Société de médecine d'Anvers.
994. Therapeutic Analyst, Norwich, Connecticut.
995. Archiv psichiatrii, neiologii i ssudobnoj psychopatologii, St. Petersburg.
996. Revue internationale de médecine et de chirurgie, Paris.
997. Gazzetta Medica di Torino.
998. Medical and Surgical Observer, Jackson, Tenn.
999. Zeitschrift für Orthopädische Chirurgie, Würzburg.
1000. Oesterr. Zeitschrift für Pharmacie.
1001. Blätter für klinische Hydrotherapie und verwandte Heilmethoden, Vienna.
1002. Giornale speciale di Farmacia Sperimentale e chimica clinica, Naples.
1003. Veterinary Journal, London.
1004. Archives d'obstétrique et de gynécologie, Paris.
1005. Deutsche Zeitschrift für Nervenheilkunde, Heidelberg.
1006. Journal of Comparative Neurology, Granville, Ohio.
1007. Ophthalmic Record, Nashville, Tenn.
1008. Monatshefte für Chemie.
1009. Giornale del Assoc. Napolitana di Med., etc.
1010. Climatoterapia, Barcelona.
1011. Fortschritte der Geburtshülfe und Gynækologie, Wiesbaden.
1012. Therapeutic Review, New York.
1013. International Clinics, Philadelphia.
1014. Boletin de sanidad militar, Buenos Ayres.
1015. Annales d'hypnologie et de psychiatrie, Paris.
1016. Anales del departamente nacional de higiene, Buenos Ayres.
1017. American Dermatologist, Indianapolis.
1018. Annals of Ophthalmology and Otology, Kansas City.
1019. Bulletin of Pharmacy, Detroit.
1020. Gaceta Medica Quezalteca, Quezaltenango, Guatemala.
1021. Bibliographie der klinischen Helminthologie, Munich.
1022. Gli Incurabili, Giornale di Clinica e di Terapia, Naples.
1023. L'Ingegnaria sanitaria, Torino.
1024. Boletin del hospital general de Puebla.
1025. Bulletin de médecine et de pharmacologie d'Athènes.
1026. International Centralblatt für die Phys. und Path. der Harn und Sexualorgane.
1027. Chicago Medical Journal.
1028. Dental Office and Laboratory, Philadelphia.
1029. Eurêka. Revue scientifique et industrielle, Paris.
1030. Medical and Surgical Record, Madison, Neb.
1031. New York Medical Examiner.
1032. National Popular Review, San Diego, Cal.
1033. The Prescription, Danbury, Conn.
1034. Revue chirurgicale, Paris.
1035. Revue de thérapeutique générale et thermale, Paris.
1036. Wochenschrift für Chemie und Pharmacie.
1037. Bulletins de la Société française d'hygiène, Paris.
1038. Le Languedoc Médical, Toulouse.
1039. Annali di nevrologia, Naples.

1040. Internationale Beiträge zur wissenschaftlichen Medicin.
1041. Tidskrift f. Sundhedspleje.
1042. Annales de chirurgie, Paris.
1043. Archives provinciales de chirurgie.
1044. Revue du Dispensaire du Louvre, Paris.
1045. La Roumanie Médicale, Bucharest.
1046. Utchenyia Zapiski Kasanskaho Veterinärnaho Instituta.
1047. Pharmaceutische Centralblatt.
1048. Practitioners' Monthly, Syracuse, N. Y.
1049. Zeitschrift des allgemeinen österreichischen Apotheker-Vereines, Vienna.
1050. Revista de la Sociedad medica Argentina, Buenos Ayres.
1051. Revue de la Tuberculose, Paris.
1052. Chicago Medical Recorder.
1053. Bulletin of the Harvard Medical School Association, Boston.
1054. The General Practitioner, St. Louis.
1055. Indian Medical Reporter, Calcutta.
1056. Hygieia, Stuttgart.
1057. Journal d'hygiène populaire, Montreal.
1058. Food, New York.
1059. Chicago Lancet.
1060. Climates and Resorts, Chicago.
1061. Archives d'électricité médicale, Bordeaux.
1062. Revista de Higiene, Bogotá.
1063. Charlotte Medical Journal, Charlotte, N. C.
1064. The Corpuscule, Chicago.
1065. Florida Medical and Surgical Reporter.
1066. La Revista Médico Quirúrgica, New York.
1067. The Alkaloid, Chicago.
1068. Tablettes mensuelles de la Société royale de médecine publique de Belgique, Bruxelles.
1069. The Medical Press, New York.
1070. Health and Home, Louisville, Ky.
1071. Revue Théorique et Pratique des Maladies de la Nutrition, Paris.
1072. Ontario Medical Journal, Toronto.
1073. Journal of State Medicine, London.
1074. Psychiatrische Jahrbücher.
1075. New York Polyclinic.
1076. American Journal of Surgery and Gynæcology, Kansas City.
1077. The Clinical Journal, London.
1078. Yüjno-Rüsskaia Meditzinskaia Gazeta, Odessa.
1079. Sanative Medicine, Westerville, O.
1080. Chicago Clinical Review.
1081. Revista médico-social, Madrid.
1082. Budapest Hygienischer Zeitung.
1083. Revue médicale de la Franche-Comté.
1084. Aerztliche Rundschau.
1085. Archivii ed atti della Società Ital. di Chirurgia.
1086. Medicinsk Revue, Bergen.
1087. Shurnal russkago obschtschestva ochranenija narodnago sdrawinga, St. Petersburg.
1088. Le Midi Médical, Toulouse.
1089. Zeitschrift für Hypnotismus.
1090. Revue Neurologique, Paris.
1091. Leeward Islands Medical Journal.
1092. Indian Medico-Chirurgical Review, Bombay.
1093. Medical Magazine, London.
1094. Boletín del Consejo Superior de Salubridad de Guadalajara.
1095. La Puglia Medica, Bari.
1096. Revue générale de médecine, de chirurgie et d'obstétrique, Paris.
1097. Archivio internazionale di medicina e chirurgia, Naples.
1098. Woman's Medical Journal, Toledo.
1099. Gross Medical College Bulletin, Denver.
1100. Magyar Orvosi Archivum, Budapest.
1101. Archives des Sciences biologiques, St. Petersburg.
1102. Gazzetta Medica di Pavia.
1103. Dental Practitioner, Buffalo.
1104. Le Trimestre Médical, Brussels.
1105. Archivio italiano di otologia, rino-logia, e laringologia, Turin.
1106. La Médecine Nouvelle, Paris.
1107. Annales für Hydrographie, Berlin.
1108. Abeja Medica, Havana.
1109. Anatomische Hefte, Giessen.
1110. Annales de le Policlinique de Lille.
1111. Bolétin del Manicomio de San Baudilio de Llobregat, Barcelona.
1112. Electricidad Médica, Barcelona.
1113. Gazzetta medica delle puglie, Bari, Italy.
1114. Gaceta Medica Municipal, Havana.
1115. Heraldico Medico-Farmacéutico, Madrid.

1116. Internationale Monatschrift zur Bekämpfung der Trinksitten, Bremerhaven.
1117. L'Univers Médical, Paris.
1118. La Higiene, Havana.
1119. Medicinische Novitäten, Leipzig.
1120. Odontoskop, Budapest.
1121. Prensa Medica de Malaga.
1122. Veshukdorpon (Mirror of Medicine, Bengali), Calcutta.
1123. Western Medical Record, Chicago.
1124. Wisconsin Medical and Surgical Journal, Waukesha, Wis.
1125. Zeitschrift für Nervenheilkunde, Erlangen.
1126. Revue internationale de Thérapeutique et de Pharmacologie, Paris.
1127. El Agricultor, Bogotá.
1128. Revue Médico-chirurgicale du Brésil.
1129. Annales de l'Institut de Pathologie et de Bactériologie, Bucharest.
1130. Ungarisches Archiv für Medicin, Budapest.
1131. Giornale dello istituto Nicolai, Milan.
1132. Annales médico-chirurgicales du Cercle médical borain, Paturages.
1133. McCaskey's Clinical Studies, Fort Wayne.
1134. Journal médical de l'Armée, Athens.
1135. St. George's Hospital Gaz., London.
1136. Northumberland and Durham Medical Journal, England.
1137. Rhode Island Medical Science Monthly, Providence.
1138. St. Joseph Medical Journal, St. Joseph, Mo.
1139. Journal de Clinique et de Thérapeutique infantile.
1140. Hospital Bulletin of the Second Minnesota Hospital.
1141. Balneologische Rundschau.
1142. La Pædiatria
1143. Boletín de Medicina de Santiago.
1144. The Tri-State Medical Journal, Keokuk, Ia.
1145. Le Limousin Médical.
1146. Chugai Ijishimpo, Tokio.
1147. Archivis di pharmacologia e terapeutica.
1148. Gyógysz Kozl, Hungary.
1149. Annales de la Policlinique de Toulouse.
1150. Mathews's Medical Quarterly.
1151. Archiv für Laryngologie.
1152. Louisville Medical Monthly.
1153. La Presse Médicale, Paris.
1154. New York State Medical Reporter, Rochester.
1155. Revue Mensuelle de Stomatologie, Paris.
1156. Rivista di Patologia e Terapia delle Malattie della Gola, del Naso, e dell' Orecchio, Florence.
1157. Dermatologische Zeitschrift, Berlin.
1158. Gazette hebdomadaire de la Russie Meridionale, Odessa.
1159. Teratologia, London.
1160. La Flandre Médicale, Ghent.
1161. The Refractionist, Boston.
1162. German-American Medical Journal, St. Louis.
1163. Louisville Medical Monthly, Louisville.
1164. The Railway Surgeon, Chicago.
1165. La Lancetta, Cienfuegos.
1166. Revista Estomatologica, Madrid.
1167. Archivio italiana di clinica medica.
1168. La Clinique, Montreal.
1169. Monatschrift für prakt. Wasserheilkunde, etc., Munich.
1170. Medicine, Detroit.
1171. New York Eye and Ear Infirmary Reports.
1172. The National Medical Review, Washington.
1173. Annali di Medicina Navale, Rome.
1174. The Colo. Climatologist, Denver.
1175. La Policlinique, Bruxelles.
1176. Vrathebnia Zapisky.
1177. Cronica di clin. med. di Genova.
1178. Deutsche Monats. f. Zahnheil.
1179. Pacific Druggist and Physician, San Francisco.
1180. Journal Odontologique.
1181. La Médecine Infantile, Paris.
1182. Journal of Medicine and Science, Portland, Me.
1183. Bulletin of the American Academy of Medicine, Easton, Pa.
1184. Archives de Pharmacodynamie, Paris.
1185. La Bourgogne Médicale.
1186. Cleveland Journal of Medicine.
1187. Intercolonial Quarterly Journal of Medicine and Surg., Melbourne.
1188. Atlantic Medical Weekly, Providence.

1189. Le Nord Médical, Lille.
1190. Monatsschrift für Geburtshilfe und Gynækologie.
1191. Annales suisses des Sciences Médicales, Geneva.
1192. American Gynæcological and Obstetrical Journal, New York.
1193. Annales de la Société belge de Chirurgie.
1194. Pediatrics, New York.
1195. Annales de la Société médico-chirurgicale du Brabant.
1196. Archiv. di Oftalmologia.
1197. Morphologisches Arbeiten, Schwalbe.
1198. L'Obstétrique, Paris.
1199. Rivista di Ostetricia, Ginecologia, e Pediatria, Torino.
1200. Le Correspondant Médical, Paris.
1201. Revue des Maladies Cancéreuses, Paris.
1202. La Chronique Médicale, Paris.
1203. Bulletin de la Société royale des Sciences Médicales et Naturelles de Bruxelles.
1204. Monatsschrift für Unfallheilkunde, Berlin.
1205. Langdale's Lancet, Kansas City.
1206. Codex Medicus, Philadelphia.
1207. La Semaine Gynécologique, Paris.
1208. La Semana Médica, Buenos Aires.
1209. State Hosp. Bulletin, Utica, N. Y.
1210. Clinica Moderna.
1211. Meditzina, Bulgaria.
1212. Journal of the Chemical Society, London.
1213. Süd-deutsch. Apotheker-Zeitung.
1214. Centralblatt f. innere Med.

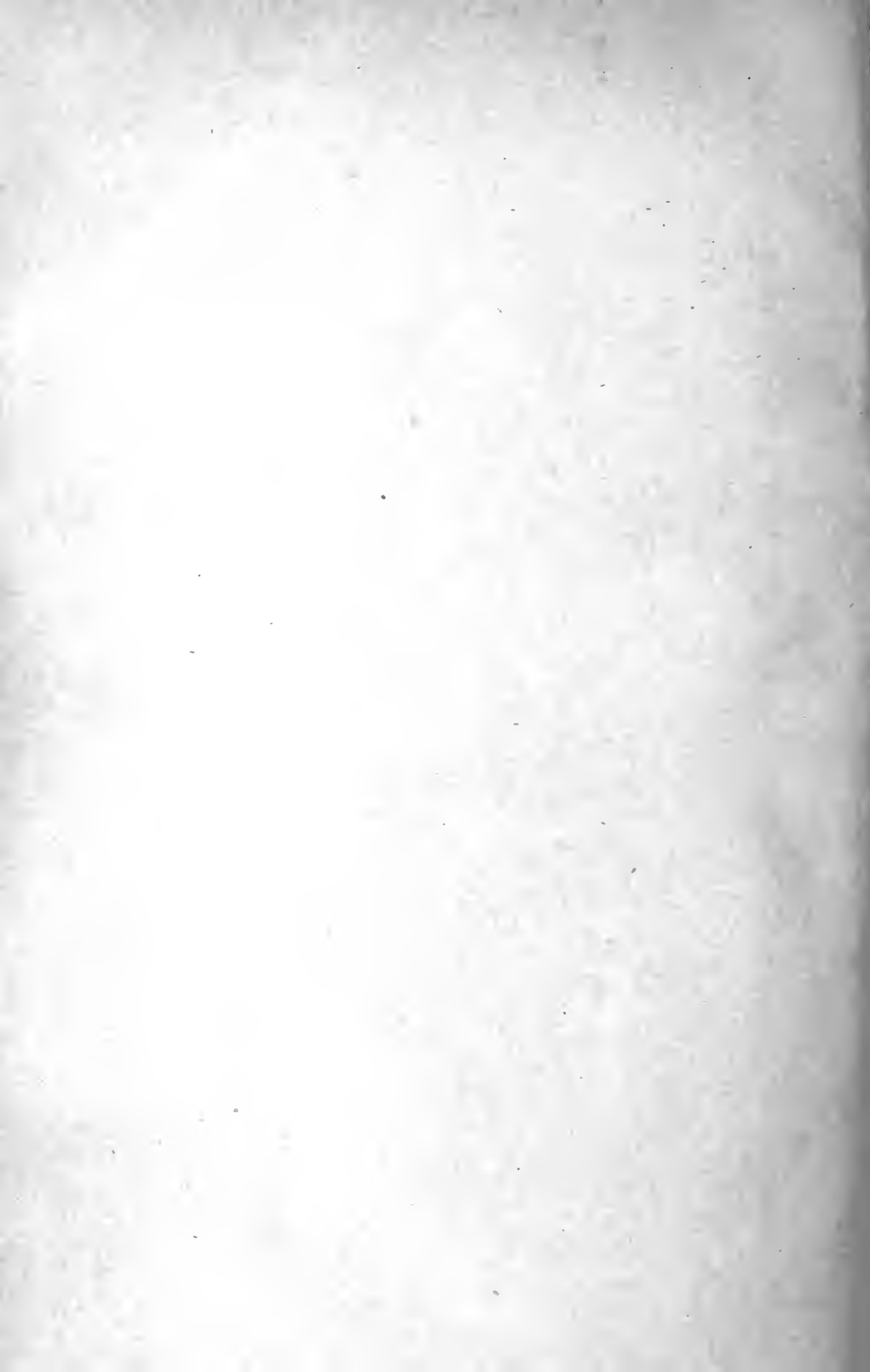
BOOKS, MONOGRAPHS, THESES, ETC.

2000. Thèse de Paris.
2001. Festschrift zum 25. Jaehr. Jubilæum des Vereins Deutscher Aerzte zu San Francisco, 1894.
2002. Hypertrophie du cœur, par le Dr. G. André.—Bibliothèque médicale Charcot-Debove. Rueff, éditeur.
2003. Transactions of the Medical Association of Central New York.
2004. Report on Cholera in England in 1893.
2005. Traité de Médecine.
2006. Bericht über die Verhandlungen des XIII Congress für innere Medicin.
2007. Macewen. Pyogenic Diseases of the Brain and Spinal Cord.
2008. Quain's Dictionary of Medicine.
2009. Moncorvo. De la nature de la coqueluche et de son traitement germicide topique. Broch. in 8vo. Paris, 1895.
2010. Addison. On Disease of the Suprarenal Capsules. London, 1855.
2011. Engineering News.
2012. Veterinary Journal.
2013. Report of the Royal Commission on Tuberculosis. Copenhagen.
2014. Morphologische Arbeiten.
2015. Transactions of the Eleventh International Medical Congress, Rome.
2016. Taylor. Medical Jurisprudence.
2017. Analytical Pharmacy.
2018. De Luna. De l'importance respective de l'Hcl libre et de l'Hcl combiné dans le suc gastrique. Marseille: Barthelet.
2019. Sitzungsberichte der Würzburger physik.-med. Gesellschaft.
2020. Lucas-Championnière. Traitement des Fractures par le Massage et la mobilization. Paris.
2021. Proceedings of the Illinois State Medical Society.
2022. Bouveret. Maladies de l'Estomac. Paris.
2023. Festschrift für Thierfelder.
2024. Turmel. Sur le Mérycisme. Paris: Chez Steinheil.
2025. Thèse de Lille.
2026. Boix. Le foie des dyspeptiques. Paris: Asselin et Houzeau.
2027. Transactions of the Association of American Physicians.
2028. Inaugural Dissertation. Göttingen.
2029. Sitzungsbericht Med. Verein. Hamburg.
2030. De Grazio. Studio clinico ed anatomico su di alcuni stati morbosì del pancreas. Naples.
2031. Inaugural Dissertation. Leipzig.
2032. Réclus. La Cocaïne en Chirurgie. Paris, 1895.
2033. Schauman. Zur Kenntniss der sogenannten Bothriocephalus-

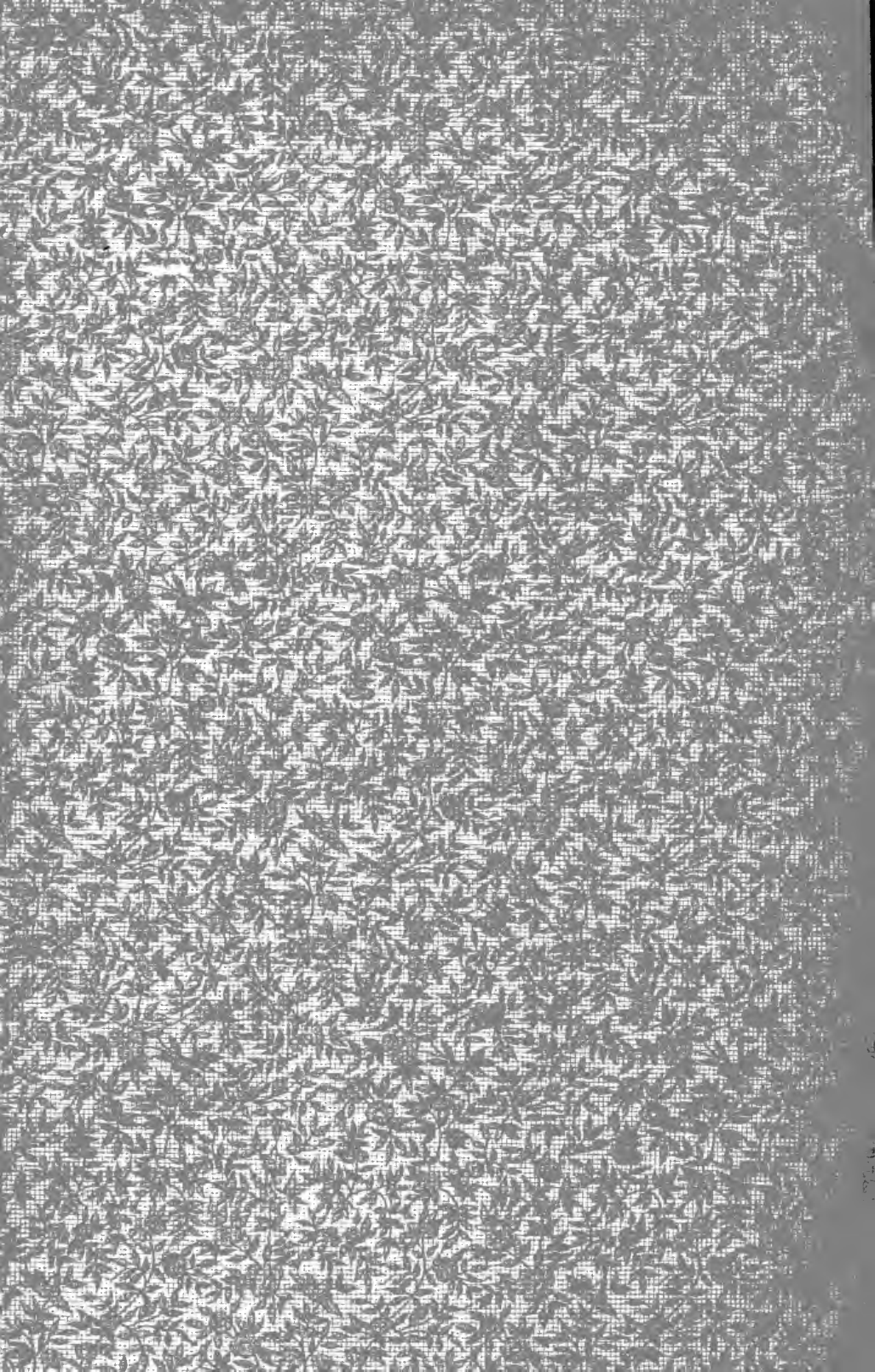
- Anæmie. Helsingfors: Weilin & Göös, 1894.
2034. Inaugural Dissertation. Zurich.
2035. André. Précis clinique des Maladies du Système Nerveux. Paris: O. Doin.
2036. Journal of the College of Science, Imperial University of Japan, Tokyo.
2037. Looss. Ueber den Bau von Distomum heterophyes v. Sieb. und Distomum fraternum n. sp. 8vo. 59 p. Mit 2 Taf. Cassel: Fisher & Co., 1894.
2038. Inaugural Dissertation. Würzburg.
2039. Inaugural Dissertation. Basel.
2040. Arbeiten aus der Zool.-Zoot. Institut in Würzburg.
2041. Atti della Reale Accademia delle Scienze dell' Istituto di Bologna.
2042. Festschrift till Professor Heiberg. Christiania.
2043. Thesis. St. Petersburg.
2044. Transactions of the London Pathological Society.
2045. Thèse de Lyon.
2046. Thèse de Moscow.
2047. Von Ott. Beiträge zur Kenntniss der ectopischen Formeu der Schwangerschaft. Klinische und experimentelle Untersuchungen. Verlag von Ed. Besold (A. Georgi), Leipzig.
2048. Transactions of the Ophthalmological Society of the United Kingdom.
2049. Medical and Surgical History of the War of the Rebellion. Surgical volume.
2050. Halford. Thoughts, Observations, and Experiments on the Action of Snake-Venom on the Blood. Melbourne.
2051. Brenning. Die Vergiftungen durch Schlangen. Stuttgart: Ferdinand Enke.
2052. Treves. System of Surg. London.
2053. Meisenbach. Craniectomy, — an Improved Technique.
2054. Proceedings of the American Physiological Society.
2055. Report of the Ohio Board of Pardons, 1894.
2056. Transactions of the Royal Medico-Chirurgical Society. London.
2057. Transactions of the Philosophical Society. London.
2058. Sitz. ber. d. Königl. preuss. Akad. d. Wiss.
2059. Archiv f. Entwicklungsmechanik der Organismen.
2060. Doyen. Traitement chirurgical des affections de l'estomac et du duodénum. Vol. i, No. 8. Paris: Rueff et Cie., 1895.
2061. Verhandlungen der deutschen Gesellschaft für Chirurgie.
2062. Transactions of the Medico-Chirurgical Society of Edinburgh.
2063. Pantaloni. Contribution à l'Etude de la Chirurgie du Foie: Traitement des Abscess Intra-Hépatiques.
2064. Warfvinge's Festschrift. Stockholm.
2065. Charcot. Traité de Médecine.
2066. Riedel. Erfahrungen über die Gallensteinkrankheit mit und ohne Icterus. Berlin: Hirschwald.
2067. U. S. Marine-Hospital Report.
2068. Jahrbuch der Hamburg. Staatskrankenhalten.
2069. Galliard. Pneumothorax. Bibliothèque Charcot-Debove.
2070. Debove et Achard. Traité de Médecine.
2071. Davies Thomas. Hydatid disease. London.
2072. Medical and Chirurgical Transactions. London.
2073. Huggard. Paracentesis Needle. Made by Arnold & Sons, London.
2074. Ryall. Rectal Speculum. Made by Allen & Hanburys, London.
2075. Compte Rendu du 1er Congrès de Médecine Interne. Lyon, 1894.
2076. Ziemssen's Handbuch.
2077. Schwartz. Medicinische Jahrbuch.
2078. Transactions of the New Sydenham Society. London.
2079. Cheadle. Artificial Feeding and Food. Disorders of Infants. London.
2080. Transactions of the Obstetrical Society of London.
2081. Brissaud. Leçons sur les Maladies nerveuses (Salpêtrière, 1893-1894) recueillies et publiées par Henry Meige. Paris: Masson, éditeur.

2082. Parker. Congenital Club-foot, its Nature and Treatment. London.
2083. Transactions of the American Orthopaedic Association.
2084. Bloch. Le pied plat douloureux, sa pathogénie, son traitement. Paris.
2085. Lennander. Ueber Appendicitis nebst einem Bericht über 68 Fälle, aus der Chirurgischen Klinik zu Upsala.
2086. Thompson. Catalogue of the Collection of Calculi in the Bladder in the College of Surgeons' Museum. London.
2087. Transactions of the American Genito-Urinary Association.
2088. Inaugural Dissertation. Freiburg.
2089. Transactions of the London Clinical Society.
2090. Compte Rendu du Congrès français de Chirurgie.
2091. Transactions of the Royal Academy of Medicine in Ireland.
2092. Sympton. Improved Artery-Forceps. Made by Arnold & Son, London.
2093. Bernays. Surgical Clinic. Complimentary to the Visiting Members of the Mississippi Valley Medical Association.
2094. Le Naturaliste. Paris.
2095. Proceedings of the Royal Society. London.
2096. Traité de Chirurgie clinique et opératoire. Le Dentu et Delbet. Paris: J. B. Baillière, 1895.
2097. Thèse de Bordeaux.
2098. Edinburgh Hospital Reports.
2099. Bryant, Thos. Practice of Surgery. Fourth edition. London.
2100. Neale's Medical Digest. London.
2101. Münchener Medicinische Abhandlung.
2102. Durante. Des dégénéresces secondaires. Paris.
2103. Die Erkrankungen des Rückenmarkes. I. Theil. Specielle Pathologie and Therapie von Nothnagel.
2104. Atti e rendiconti d. Reale Accad. dei Fisci critici di Siena.
2105. Inaugural Dissertation. Munich.
2106. Charcot, J. B. Contribution à l'étude de l'atrophie musculaire progressive. Paris, 1895.
2107. Inaugural Dissertation. Greifswald.
2108. Pauly. Du réveil des affections anciennes des centres nerveux. Paris, 1895.
2109. Inaugural Dissertation. Jena.
2110. Inaugural Dissertation. Berlin.
2111. Arbeit a. d. Inst. f. Anat. u. Phys. d. Centralnervensystems. Vienna.
2112. Transactions of the American Neurological Association.
2113. Bericht der Versammlung deutscher Naturforscher u. Aerzte.
2114. Inaugural Dissertation. Erlangen.
2115. Berichte der 24 deutscher Chirurgentag.
2116. Eulenberg. Realencyclopédie der gesammten Heilkunde.
2117. Schlesinger. Die Syringomyelie. Vienna, 1895.
2118. Inaugural Dissertation. Königsberg.
2119. Mémoires médicaux. Moscow.
2120. Inaugural Dissertation. Halle.
2121. Therapeutische Mittheilungen aus dem Aerzl. Verein zu Hamburg.
2122. Möbius. Neurologische Beiträge. Leipzig.
2123. Inaugural Dissertation, Strassburg.
2124. Moreira. Pharingismo tabetico. Bahia, 1894.
2125. Duplay and Réclus. Traité de Chirurgie.
2126. Londe. Héréd-ataxie cérébelleuse. Paris, 1895.
2127. Congrès français des Médecins alienistes et neurologistes. Bordeaux.
2128. Eye, Ear, Nose, and Throat Clinic. Kansas City.
2129. Wills Eye-Hospital Reports. Philadelphia.
2130. Parsons, F. S. A Practical Theory and Treatment of Tuberculosis. Philadelphia: Medical Publishing Co.
2131. D'Hotel (de Poix-Terron). Recherches sur l'étiologie de la tuberculose (hérédité et contagion dans less villages). 1894.
2132. Nocard (Ed.). Les tuberculoses animales. Paris, 1895.

2133. Jaccoud. *Traité de Pathologie interne*. Paris, 1872.
2134. Thèse de Montpellier.
2135. Transactions of the North Carolina Medical Society.
2136. Vintras. *Clinical Sketches*.
2137. Transactions of the Medico-Chirurgical Society. Edinburgh.
2138. Klebs. *Die causale Behandlung der Tuberculosis*
2139. Zmigrodsky. *Summary of Literary Research on Extra-uterine Pregnancy in Russia from 1885 to 1894* (in Russian).
2140. Mundé, Paul F. *Report of Gynecological Service at Mount Sinai Hospital*.
2141. Fournier. *Les Affections parasymphilitiques*. Paris, 1894.
2142. M. Hofmeier. *Extra-uterine pregnancy*. *Verhandlungen der physikalisch-Medicinischen Gesellschaft*. Würzburg, 1894.
2143. Jullien. *Des effets du traitement mercuriel intense et precoce sur l'évolution de la syphilis*. Paris.
2144. Testut. *Traité d'Anatomie*.
2145. Thèse de Jouriew.
2146. Le Musée de l'hôpital Saint-Louis. *Iconographie des Maladies cutanées et syphilitiques*. Ernest Besnier, A. Fournier, et cætera. Paris : Rueff et Cie.
2147. Waldeyer. *Verhandlungen der Anatomischen Gesellschaft auf der Neunten Versammlung in Basel*.
2148. *Proceedings of the Anatomical Society*. London.
2149. *Atti della R. Acad. delle Scienze med. in Palermo*.
2150. Duplaix, J. B. *Des Anévrysmes et de leur traitement*.
2151. Fick. *Lehrbuch der medicinische Physik*.
2152. Meynert. *Vom Gehirn der Säugethiere*. Stricker's Hand-book.
2153. McMurtry. *Manual of Nursing in Pelvic Surgery*. Louisville.
2154. *Transactions of the London Clinical Society*.
2155. *Pepper's System of Medicine*.
2156. Strümpell. *Text-book of Medicine*.
2157. Kitasato. *Serum Treatment of Diphtheria*. 1896.
2158. Von Heubner. *Ueber die Erfolge der Heilserum-behandlung bei Diphtherie*.
2159. Soltmann. *Ueber die erfolge mit diphtherie heilserum*.
2160. Wachsmuth. *Die hydriatische schweistreibende Behandlung der Diphtherie im Vergleich zur Serumtherapie, mit Bezugnahme auf die Statistik und die meteorologischen Verhältnisse*.
2161. Broers. *Inaugural Thesis*. Leyden.
2162. Naecke. *The Influence of Menstruation on Chronic Psychoses*.
2163. *Arbeiten aus der psychiatrik klinik in Breslau*.
2164. Dumas. *Les itats intellectuels dans la mélancholie*.
2165. *Inaugural Dissertation*. Utrecht.
2166. *The Malarial Fevers of Baltimore*. By William Sydney Thayer, M.D., and John Hewetson, M.D., Assistants in the Medical Clinic of the Johns Hopkins Hospital. Baltimore : The Johns Hopkins Press, 1895.
2167. *Gesellschaft für Geburtshilfe und Gynækologie*. Berlin.
2168. *Physiolisches Studien aus der Universität*. Budapest.
2169. *Transactions of the Fourth German Dermatological Congress*.
2170. George Oliver. *Pulse - Gauging*. London : Lewis, 1895.







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